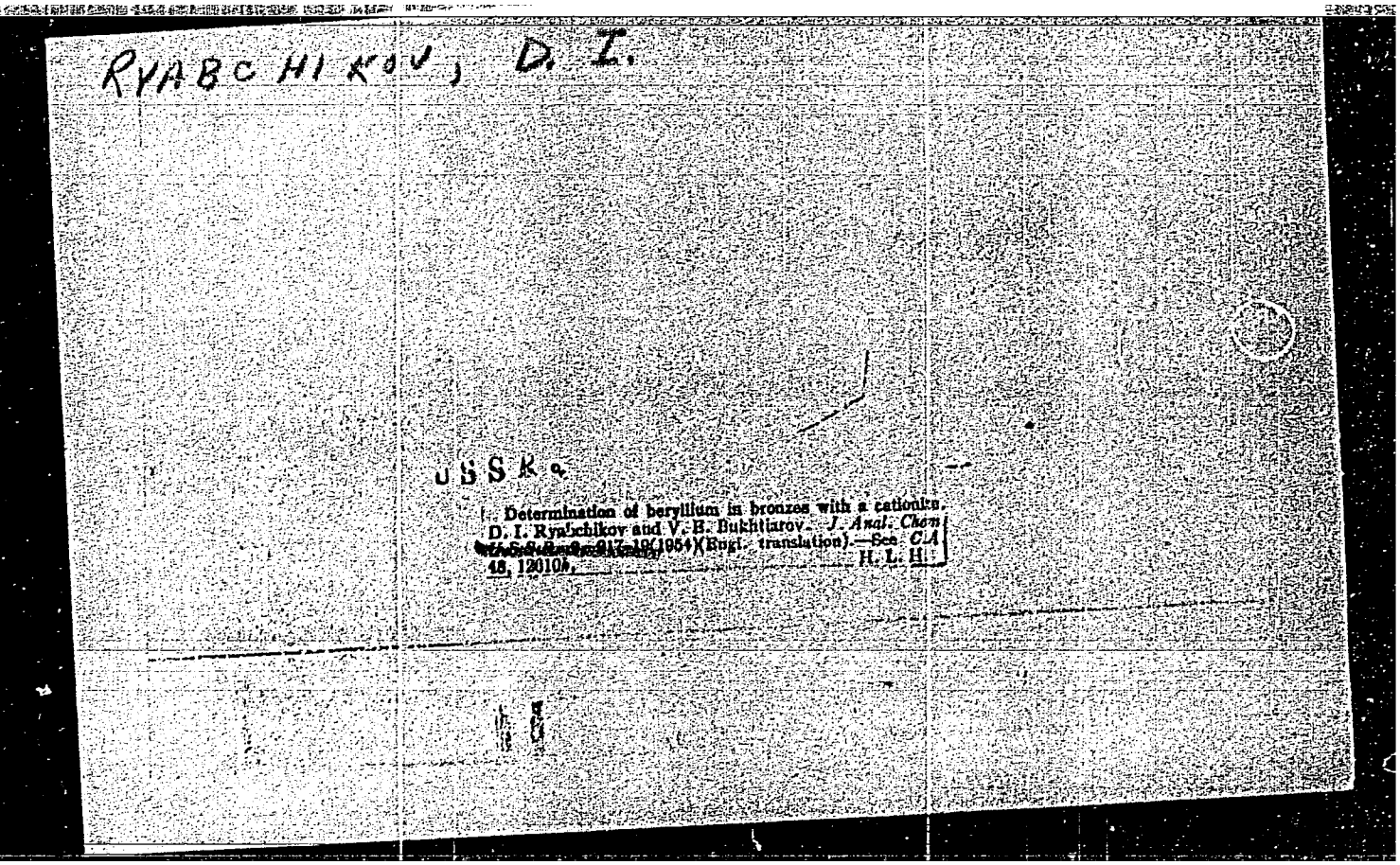


RYABCHIKOV, D. I.

USSR

1. Determination of beryllium in bronzes with a cationite. D. I. Ryabchikov and V. B. Bukhtiarov. *J. Anal. Chem* [illegible] 1954 (Engl. translation).—Sce. *C.A* 48, 12010h. H. L. H.

RYABCHIKOV, D. I.

USSR/Chemistry - Chromatography

Card : 1/1

Authors : Ryabchikov, D. I., and Osipova, V. F.

Title : Separation of chromium, manganese, iron and nickel by the method of ion-exchange chromatography

Periodical : Dokl. AN SSSR, 96, Ed. 4, 761 - 763, June 1954

Abstract : Numerous examples are given, showing the separation of heavy metals (chromium, manganese, iron, nickel) with the aid of an ion-exchanger of synthetic resin. The separation of iron from manganese is possible because the iron, in trivalent state, with pyrophosphate forms a stable complex. Chromium and manganese remain in the form of simple cations and are retained by the active resin groups. The separation of nickel from chromium is possible on the basis of the complex formation of chromium with rhodanide. Nickel does not form stable complexes when passing through the cation layer. Seven references.

Institution : Acad. of Sc. USSR, The V. I. Vernadskiy Institute of Geochemistry and Analytical Chemistry.

Presented by: Academician A. P. Vinogradov, March 8, 1954

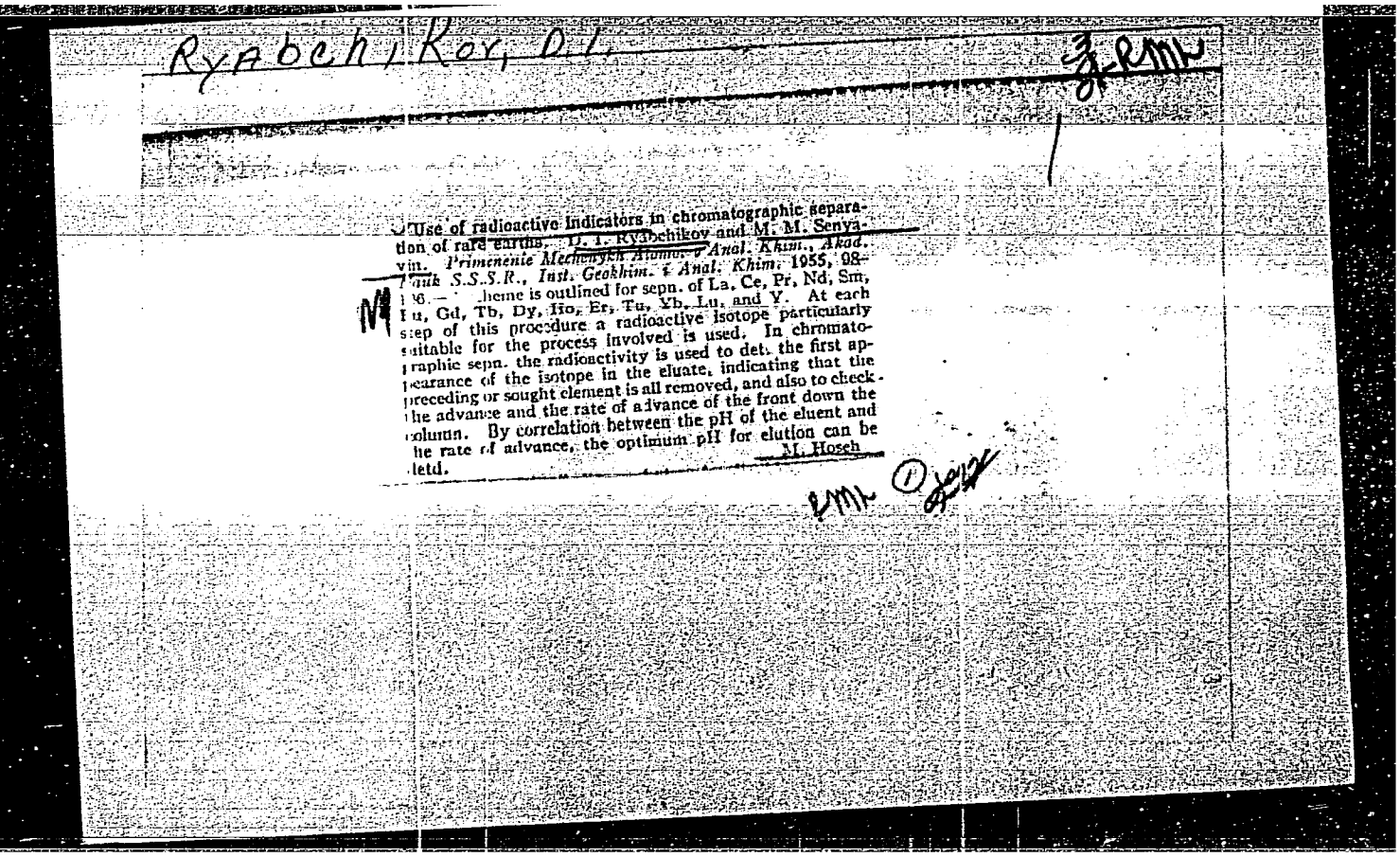
RYABCHIKOV, D. I. and SENYAVIN, M. M.

"Chromatographic Determination of Uranium in Various Materials," a paper presented at the Atoms for Peace Conference, Geneva, Switzerland, 1955

YABCHIKOV, D.I.; SENYAVIN, M.M.

[Chromatographic determination of uranium in various materials] Khromatograficheskoe opredelenie urana v razlichnykh materialakh. Moskva, 1955. 16 p. (MIRA 15:10)

(Uranium--Analysis) (Chromatographic analysis)



Ryabchikov, D.I.

Use of radioactive indicators in chromatographic separation of rare earths. D. I. Ryabchikov and M. M. Senyavin. *Primenenie Metodov Atomn. i Anal. Khim., Akad. Nauk S.S.S.R., Inst. Geokhim. i Anal. Khim.* 1955, 98–106.— A scheme is outlined for sepn. of La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tu, Yb, Lu, and Y. At each step of this procedure a radioactive isotope particularly suitable for the process involved is used. In chromatographic sepn. the radioactivity is used to det. the first appearance of the isotope in the eluate, indicating that the preceding or sought element is all removed, and also to check the advance and the rate of advance of the front down the column. By correlation between the pH of the eluent and the rate of advance, the optimum pH for elution can be detd.

M. Hosch

RYABCHIKOV, D. I.

5

Production of iodine-131 without carrier in radiochemically pure state. D. I. Ryabchikov, A. N. Ermakov, L. S. Kozyreva, and V. F. Oreshko. *Primenenie Mechenykh Atomov v Anal. Khim., Akad. Nauk S.S.S.R., Inst. Geokhim. Anal. Khim.* 1955, 179–86.—I^{131} was obtained from irradiated TeO_2. To obtain TeO_2, 10–12 g. Te was added in small portions to 20 ml. boiling HNO_3, sp. gr. 1.12. The soln. was filtered and evapd. almost to dryness. This caused $2TeO_2.HNO_3$ to crystallize. Heating the crystals at 400–30° gave TeO_2; the yield was 96%. Irradiated TeO_2 was dissolved in 10% NaOH by using 6–8 ml. for 1 g. TeO_2. The soln. was filtered and to it added slowly 6–7 ml. H_2SO_4 (1:1) for 1 g. TeO_2. To the acid soln. was added 10–30 ml. of 1.5% $Fe_2(SO_4)_3$ soln. and the mixt. was distd.; I^{131} was collected in a receiver contg. 30 ml. H_2O, 1 mg. NaOH, and if desired, 1 mg. Na_2SO_3. At least 90–100 ml. distillate was collected for each 10 g. TeO_2 used. By this method 10–25 g. TeO_2 yielded an I prepn. with an activity of 1–6 mc./ml.; the yield of I^{131} was approx. 90%. M. Hoseh

IRML

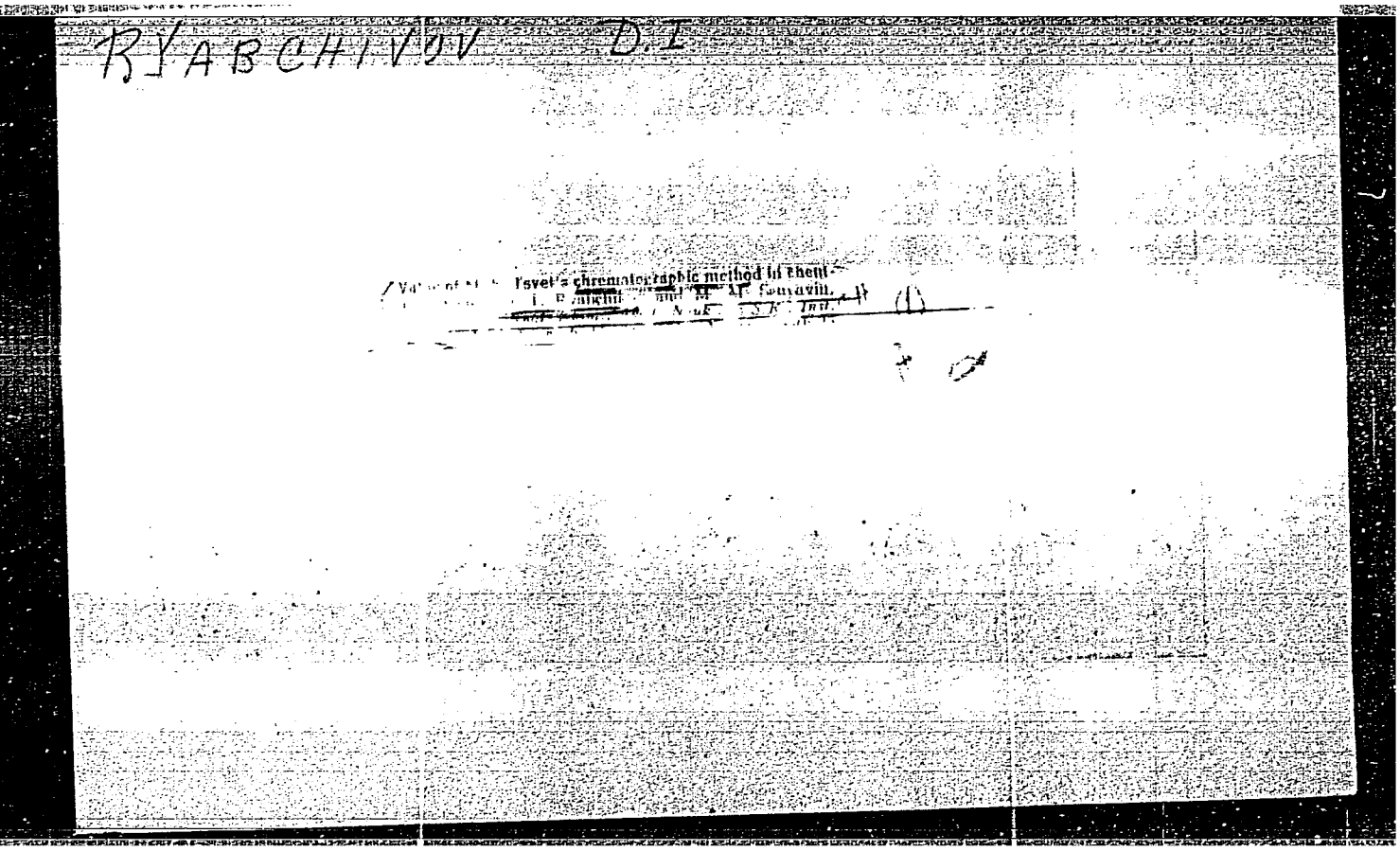
RYABCHIKOV, D. I.

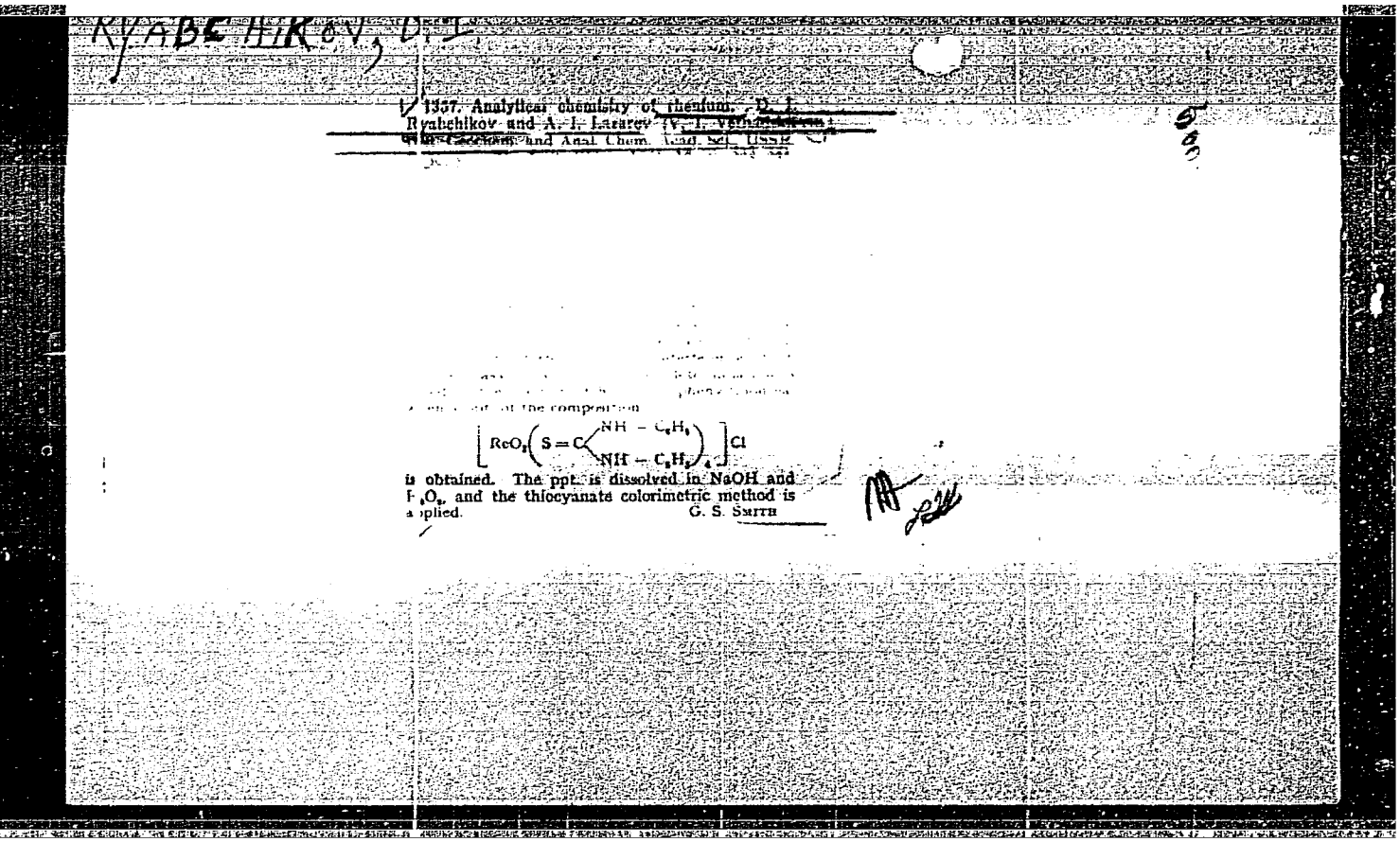
5

RM

Production of bromine-82 radioactive preparations. D. I. Ryabchikov, A. N. Ermakov, L. S. Kozyreva, and M. S. Petrova. *Primenenie Mechenykh Atomov v Anal. Khim., Akad. Nauk S.S.S.R., Inst. Geokhim. i Anal. Khim.* 1955, 187–91.—For the production of Na, K, and NH_4 bromides tagged with Br^{82}, the starting material was $BaBr_2$ rather than the usually employed org. Br compds. The use of the latter is inconvenient and the yield of radioactive Br small. $BaBr_2$ was chosen as target because neutron bombarded Ba does not form long-life isotopes, it is readily available in state of high purity, and Ba is readily adsorbed by base exchangers. $BaBr_2$ (10 g.) irradiated for 36 hrs. was dissolved in 30 ml. H_2O and the soln. passed through a chromatographic column contg. 90 ml. of swelled cationite at a rate of 0.8–1.0 ml./min./sq. cm. The column was then washed with 200 ml. H_2O, thus removing all of the Br^{82}. As cationite Amberlite IRC-50 was used as well as domestic (Russian) cationite KB-4. The cationite was treated with *N* HCl to complete removal of Fe, then transformed to a Na, K, or NH_4 form by treating with an alk. 10% soln. of NaCl, KCl, or NH_4Cl, and finally washed with H_2O to complete removal of Cl^-. By this method 95% of Br^{82} was recovered. M. Hoseh

3





RYABCHIKOV, D.I.

1337. Analytical chemistry of rhenium. D. I. Ryabchikov and A. I. Lazarev. [illegible] and Anal. Chem. Acad. Sci. USSR

[illegible] of the compound

$$\left[ReO_2\left(S=C\begin{matrix}NH-C_6H_5\\NH-C_6H_5\end{matrix}\right)_4\right]Cl$$

is obtained. The ppt. is dissolved in NaOH and H_2O_2 and the thiocyanate colorimetric method is applied.

G. S. Smith

Ryabchikov, D.I.

AID P - 1570

Subject : USSR/Chemistry

Card 1/1 Pub. 119 - 5/5

Authors : D. I. Ryabchikov and V. K. Belyayeva (Moscow)

Title : Methods for determination of humidity

Periodical : Usp. khim., 24, no.2, 240-248, 1955

Abstract : Methods of direct and indirect determination of humidity are reviewed, such as distillation, drying in a drying oven or desiccator, heating with infrared rays, and the gasometric and hydride methods. Two tables, 5 sketches, 78 references (23 Russian: 1908-1954)

Institution: None

Submitted : No date

RYABCHIKOV D. I.

USSR/Inorganic Chemistry - Complex Compounds, C

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 659

Author: Podchaynova, V. N., Krylov, Ye. I., and Ryabchikov, D. I.

Institution: None

Title: On the Valency of Copper in Some Complex Compounds

Original Periodical: Zh. neorgan. khimii, 1956, Vol 1, No 3, 406-411

Abstract: The magnetic susceptibility of a number of Cu complexes has been measured at 18° with a view toward establishing the valency of Cu in these complexes. Cu "ditizonat" [Tr. note: diphenyldithiocarbazonate ?] and the thiocyanate of Cu-n-anisidinate obtained by treating a dilute $CuSO_4$ solution with an excess of p-anisidine [methoxyaniline] (I) and KCNS are diamagnetic (the composition of neither compound has been established), which indicates that they contain Cu. The following complexes are paramagnetic (the numbers in parentheses give the values of $\mu_{(eff)}$ in μ_B calculated from Curie's law): Cu p-anisidinate sulfate obtained by treating a dilute $CuSO_4$ solution with an

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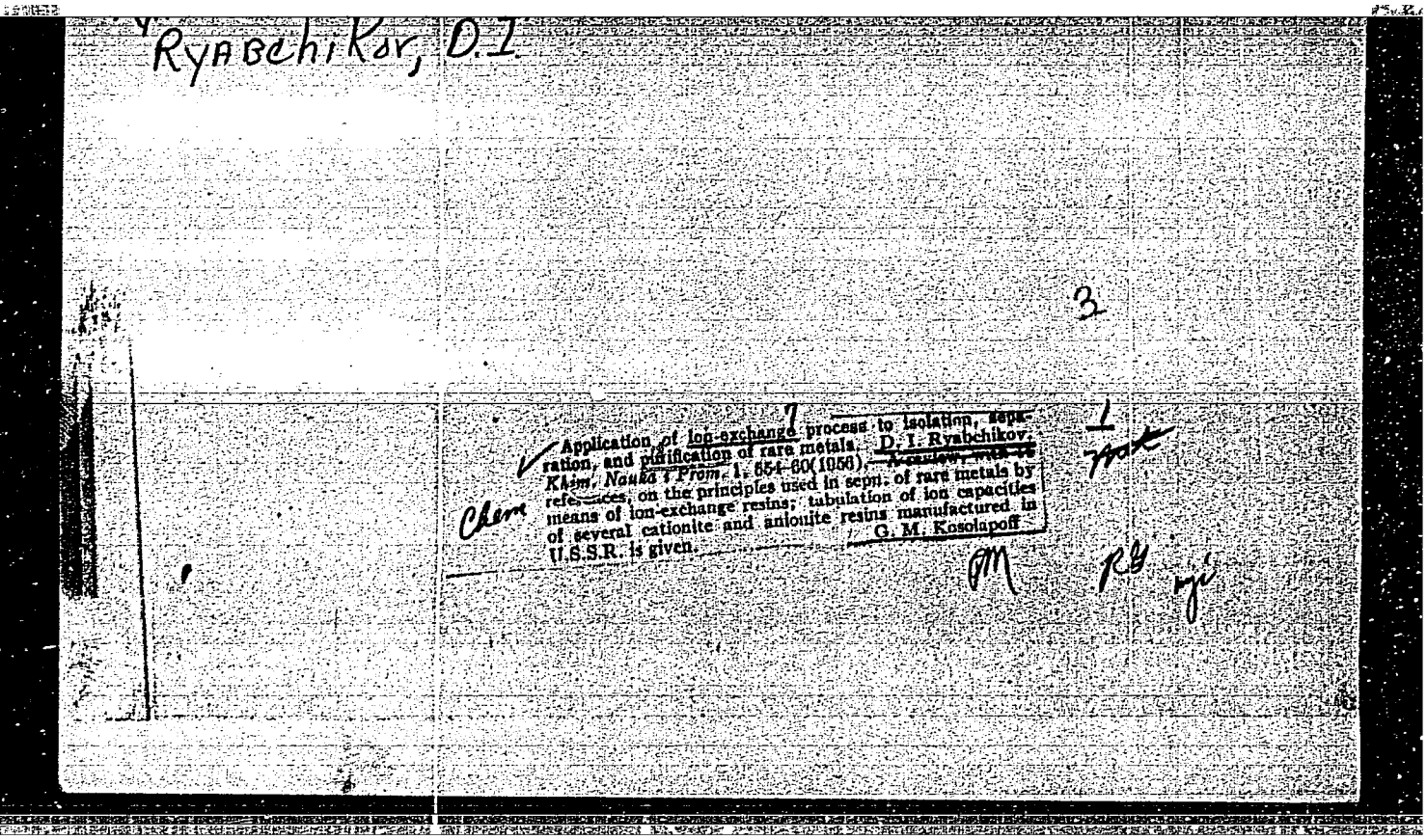

Ryabchikov, D.I.

3

Application of ion-exchange process to isolation, separation, and purification of rare metals. D. I. Ryabchikov. *Khim. Nauka i Prom.* 1, 654-60(1956). A review, with 42 references, on the principles used in sepn. of rare metals by means of ion-exchange resins; tabulation of ion capacities of several cationite and anionite resins manufactured in U.S.S.R. is given. G. M. Kosolapoff

Chem

1

RYABCHIKOV, D.I

USSR/Inorganic Chemistry. Complex Compounds. C

Abs Jour : Ref Zhur - Khimiya, No. 8, 1957, 26431.

Author : Ryabchikov, D.I., Sklyarenko, Yu.S. and Stroganova, N.S.

Inst :

Title : "Anomal" Valences of Rare Earth Elements in Processes of Their Separation. Report 1. Electrolytic Reduction of Ytterbium.

Orig Pub : Zh. neorgan. khimii, 1956, 1, No. 9, 1954 - 1967.

Abstract : The influence of various factors on the yield of Yb at the electrolytic reduction of a solution containing ytterbium acetate $Yb(Ac)_3$ and potassium citrate K_3Cit with a Hg cathode and Pt anode was studied. Dry K_3Cit was added to the solution of $Yb(Ac)_3$, pH was adjusted by adding CH_3COOH or KOH, the

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USSR/Inorganic Chemistry. Complex Compounds. C

Abs Jour : Ref Zhur - Khimiya, No. 8, 1957, 26431

the complex citrate of Yb rises simultaneously; in consequence of the action of these opposite factors, a maximum appears on the dependence curve of the yield on pH. The influence of the temperature is analogous: the dissociation of the anion $[Yb(Cit)_2]^{3-}$ rises together with the temperature and shifts the equilibrium chain $Yb^{3+} \rightleftharpoons Yb^{2+} \rightleftharpoons Yb^0$ (amalgam) to the right, but above 5° the stability of amalgam drops sharply. The yield reaches 98.2% of Yb under optimum conditions, which are as follows: pH = 6, temperature 5°, solution concentration 2.0% of Yb_2O_3, molar ratio Yb_2O_3 : K_2Cit 1 : 2.

Card 4/4

USSR/Analytical Chemistry - Analysis of Inorganic Substances, G-2

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 1236

Author: Ryabchikov, D. I., and Lazaryev, A. I.

Institution: Academy of Sciences USSR

Title: Separation of Rhenium from Vanadium and Tungsten by Ion-Exchange Chromatography

Original Periodical: Tr. komis. po analit. khimii AN SSSR, 1956, Vol 7, No 10, 64-67

Abstract: For the separation of Re from V, 100 ml of 0.3 N HCl containing less than 0.75 mg of V and varying amounts of Re are passed through a column packed with 10 gms of MMG-1 anion-exchange resin (OH form) with a flow rate under 3 ml/min. Upon washing with 0.3 N HCl the V is transferred to the filtrate and the Re retained on the column is eluted with 250 ml 2.5 N NaOH. The separation of Re from V can also be carried with SBS cation-exchange resin (hydrogen form). A solution giving an acid reaction with congo paper (100 ml) is passed through a column packed with 15 gms of cation-exchange resin (12 mm

Card 1/4

USSR/Analytical Chemistry - Analysis of Inorganic Substances, G-2

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 1236

Abstract: passed through a column of anion-exchange Al_2O_3. The column is irrigated with 20 ml of 0.1 N HCl. The Re is eluted with 75 ml of 0.1 HCl. The filtrate and wash solutions containing the Re sample are diluted to 200 ml; 25-30 ml of the solution are treated with 10 ml HCl (sp. gr. 1.19); when the solution has cooled, one milliliter of 20% KSCN or NH_4SCN and 1.5 ml of 25% solution of $SnCl_2$ in 1:1 HCl are added, and the solution diluted to 50 ml; after 10 minutes, the thiocyanate complex of Re is determined spectrophotometrically or visually. The W is eluted with 200 ml of 1:3 NH_3 solution and 50 ml water. The filtrate is combined with 50 ml of concentrated HCl and 10 ml of 0.5% gelatin solution, and heated over a water bath for 40-60 minutes. After filtration and 5 washings with hot HCl, the filter with the precipitate is ignited and heated to 700-800°; after cooling, the weight of WO_3 is determined. For the preparation of the anion-exchange Al_2O_3 column a 250 ml beaker is filled with 75-100 gms of powdered Al_2O_3; the powder is covered with water and shaken. After 2 minutes the fine suspension is decanted. The procedure is repeated 5 times, after which the Al_2O_3 is dried and heated to 900-1,000° for 30-40 minutes. The Al_2O_3 thus prepared is good for 50 operating cycles.

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RYABCHIKOV, D. I.

1116. Separation of magnesium, aluminium, chromium, manganese, iron, nickel and copper by ion exchange. D. I. Ryabchikov and V. F. Ouipova (V. I. Vernadskii Inst. of Geochem. and Anal. Chem., Acad. Sci., USSR, Moscow). *Zhur. Anal. Khim.*, 1956, 11 (3), 278–286.—To separate Cu, Al and Mg, the soln. is treated with $Na_2S_2O_3$ soln. until it is colourless and passed through a column of cationite (KU-2) (Na form); Al and Mg are retained and Cu passes through as $Cu(S_2O_3)_3$. Treatment of the column with 5% NaOH soln. sets free the Al and further treatment with 4 *N* HCl yields the Al. To separate Cr and Fe, (*a*) the soln. is heated with NH_4SCN soln. and passed through the column in the H form; the Fe, which is retained, is extracted with 4 *N* HCl; or (*b*) the soln. is treated with $Na_4P_2O_7$ and at a pH of 1 to 3 is passed through the column in the Na form; and the Cr, which is retained, is then washed through with 10% H_2SO_4. To separate Mn and Fe, the soln., pH 2 to 3 after treatment with $Na_4P_2O_7$, is passed through the column in the Na form and the retained Mn is extracted with 10% H_2SO_4. To separate Cr and Mn, the column in the Na form is used either with the thiocyanates (Mn is retained) or the pyrophosphates (Mn is retained). To separate Fe, Cr and Mn, $Na_4P_2O_7$ is added and the Cr and Mn, which are retained on a column and then washed through with acid, are separated in thiocyanate soln. To separate Cr and Ni, a thiocyanate soln. is also used (Ni is retained).

G. S. Smith

RYABCHIKOV, D. I.

3/ 6

4E4j
4E2c

Use of phytic acid in the analytical chemistry of thorium. D. I. Ryabchikov, V. K. Belyaeva, and A. N. Ermakov (V. I. Vernadskii Inst. Geochem. and Anal. Chem., Moscow). *Zhur. Anal. Khim.* 11, 658-67(1956).—Phytic acid pptd. quite a few elements, but its selectivity can be adjusted by controlling the pH. Phytic acid pptd. Th in wide range of HNO_3 concn. The ppt. was unaffected by a 6-fold excess of phytic acid. After calcining at 1100°, the compn. of the ppt. was $ThO_2.P_2O_5$. To perfect a method for detn. of Th in monazite concentrates the effect of elements usually encountered in monazite was studied. By pptg. at 6*N* HNO_3, Th was sepd. from most of the accompanying elements including the rare earths. The elements that coppt. with Th under these conditions were Zr, Ti, U, and Fe. These were combined with oxalic acid to give complexes, thus preventing their pptn. A procedure for the analysis of monazite is given. The accuracy of the method is ±0.1% abs.

M. Hosch

MT

VINOGRADOV, A.P.; ALIMARIN, I.P.; KLYACHKO, Yu.A.; RYABCHIKOV, D.I.; HUDNEV, N.A.; RUDENKO, N.P.; TOROPOVA, V.F.; SHIFRIN, Kh.V.

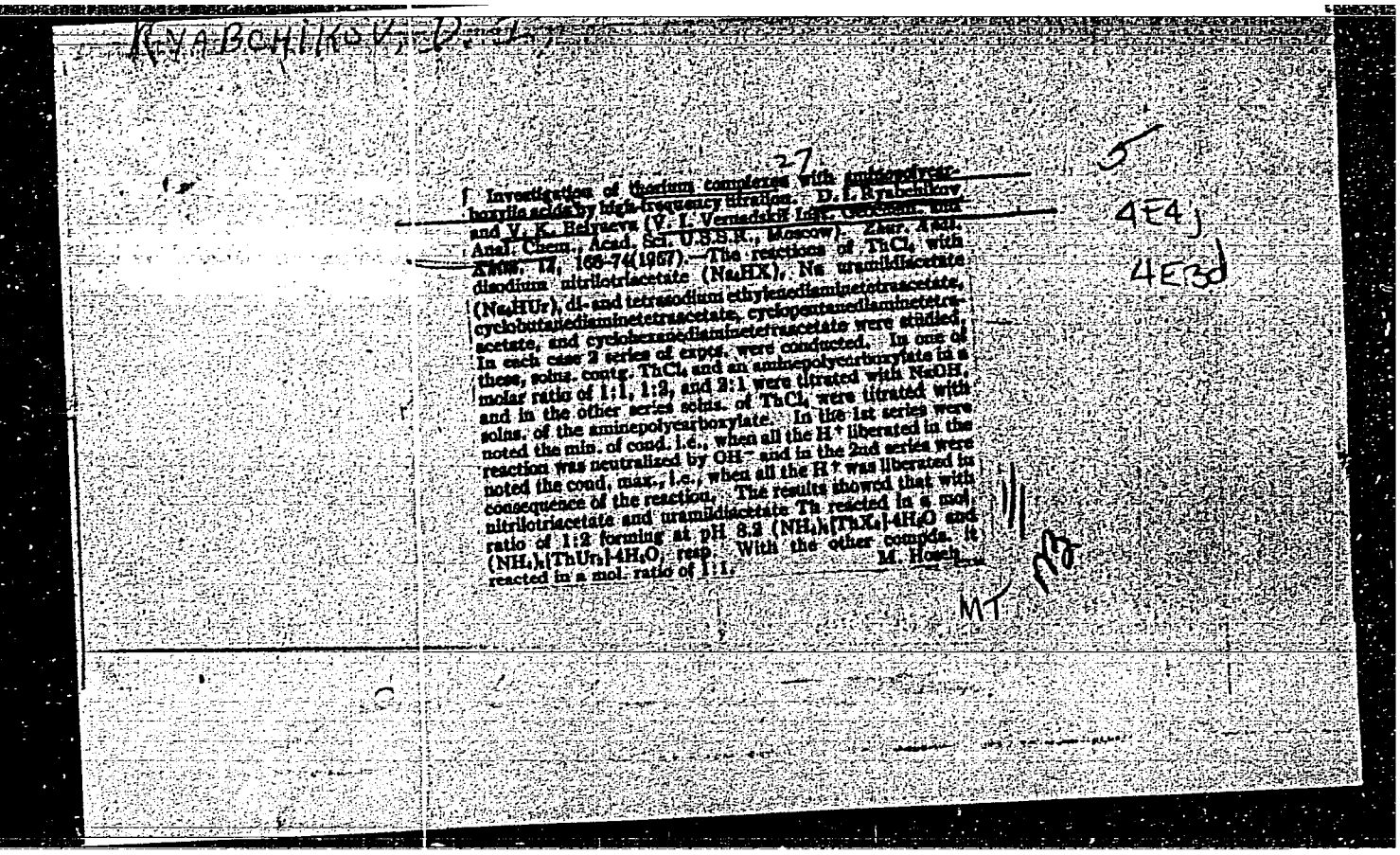
Alekseĭ Mikhailovich Vasil'eyv. Zav.lab. 22 no.7:887 '56. (MIRA 9:12)
(Vasil'ev, Alekseĭ Mikhailovich, 1882-1956)

RYABCHIKOV, D.I.

RYABCHIKOV, D.I.; VAGINA, N.S.

Complex formation of tetravalent cerium with acetate ions and oxalate ions. Part 1: Separation of cerium of spectral purity from a sulfuric acid solution. Zhur.neorg.khim. 2 no.9:2109-2114 S '57. (MIRA 10:12)

(Cerium) (Sulfuric acid)



RYABCHIKOV, D. I.

27

Investigation of thorium complexes with aminopolycarboxylic acids by high-frequency titration. D. I. Ryabchikov and V. K. Belyaeva (V. I. Vernadskii Inst. Geochem. and Anal. Chem., Acad. Sci. U.S.S.R., Moscow). Zhur. Anal. Khim. 22, 168-74(1967).—The reactions of $ThCl_4$ with disodium nitrilotriacetate (Na_2HX), Na uramildiacetate (Na_2HUr), di- and tetrasodium ethylenediaminetetraacetate, cyclobutanediaminetetraacetate, cyclopentanediaminetetraacetate, and cyclohexanediaminetetraacetate were studied. In each case 2 series of expts. were conducted. In one of these, solns. contg. $ThCl_4$ and an aminepolycarboxylate in a molar ratio of 1:1, 1:2, and 2:1 were titrated with NaOH, and in the other series solns. of $ThCl_4$ were titrated with solns. of the aminepolycarboxylate. In the 1st series were noted the min. of cond. i.e., when all the H^+ liberated in the reaction was neutralized by OH^- and in the 2nd series were noted the cond. max., i.e., when all the H^+ was liberated in consequence of the reaction. The results showed that with nitrilotriacetate and uramildiacetate Th reacted in a mol. ratio of 1:2 forming at pH 8.2 $(NH_4)_4[ThX_4]\cdot 4H_2O$ and $(NH_4)_4[ThUr_4]\cdot 4H_2O$, resp. With the other compds. it reacted in a mol. ratio of 1:1.

M. Hosek

5

4E4j

4E3d

RYABCHIKOV D. I.

5(2) PHASE I BOOK EXPLOITATION SOV/1727

Akademiya nauk SSSR. Institut geokhimii i analiticheskoy khimii

Redkozemel'nyye elementy; polucheniye, analiz, primeneniye (Rare Earth Elements; Extraction, Analysis and Application) Moscow, Izd-vo AN SSSR, 1958. 331 p. 2,200 copies printed.

Resp. Ed.: D. I. Ryabchikov, Professor; Editorial Board: I. P. Alimarin, Corresponding Member, USSR Academy of Sciences, I. N. Zaozerskiy, Doctor of Chemical Sciences, R. V. Koglyarov, Candidate of Technical Sciences, V. I. Kuznetsov, Doctor of Chemical Sciences, M. M. Senyavin, Candidate of Chemical Sciences, and Yu. S. Sklyarenko, Candidate of Chemical Sciences; Eds. of Publishing House: D. N. Trifonov and T. G. Levi; Tech. Ed.: S. G. Markovich.

PURPOSE: This book is intended for scientists, chemists, teachers and students of higher educational institutions, chemical and industrial engineers, and other persons concerned with the extraction, preparation, use, or study of rare earth elements.

COVERAGE: This collection contains reports presented at the June 1956 Conference on Rare Earth Elements at the Institute of Geochemistry and Analytical Chem-

Card 1/[redacted]

istry imeni V. I. Vernadskiy of the Academy of Sciences USSR. The articles treat chemical methods of separating rare earth mixtures, methods of processing rare earth ores, ion exchange chromatography, chemical analysis, and some industrial applications of rare earths. Aside from contributing authors, the editors mention the following Soviet scientists, who are studying rare earth elements, rare earth deposits, extraction methods, and the preparation of oxides and salts: Martynov, Mel'nikov, Khrushchev, Melikov, Pisarzhevskiy, Chernyak, Tanatar, Belousov, Zhukov and especially, N. A. Orlov, who first obtained the majority of rare earth elements in the pure state, separated many complex molecular compounds of these elements, and determined their specific properties. References are given at the end of each article.

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RYABCHIKOV, D.I.

RYABCHIKOV, D.I.

KARGIN, V.A.

5(3) p4 PHASE I BOOK EXPLOITATION SOV/1589

Akademiya nauk SSSR.

Khimiya bol'shikh molekul; sbornik statey (Chemistry of Large Molecules; Collection of Articles) Moscow, Izd-vo AN SSSR, 1958. 299 p. (Series: Akademiya nauk SSSR. Nauchno-populyarnaya seriya) 30,000 copies printed.

Compiler: G.V. Sklovskiy; Resp. Ed.: A.V. Topchiyev, Academician; Ed. of Publishing House: V.A. Boyarskiy; Tech. Ed.: I.N. Guseva.

PURPOSE: This book is intended for a wide circle of readers including those who have had no training in chemistry. It can also serve as a manual for propagandists, teachers, and journalists.

Card 1/8

Chemistry of Large Molecules (Cont.) SOV/1589

COVERAGE: This collection of articles reflects the trend for the future development of the Soviet chemical industry as indicated by the May plenary session of the Central Committee of the Communist Party within the framework of the new Seven Year Plan. These articles were published in newspapers and journals. The authors, scientists and industry workers, developed the theme of accelerated development of the chemical industries, and sciences, with stress on the manufacture of synthetic fibers, plastics, and other materials. Some of the articles were abridged, revised, or enlarged. The articles were selected so as to give an adequate survey of the chemistry and technology of high-molecular-weight compounds and their use in industry, agriculture, and in the manufacture of consumers' goods. Mentioned are raw materials for the production of polymers. This book belongs to the popular-science series of the Academy of Sciences. Similar volumes are intended for future publication. No references are given.

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Chemistry of Large Molecules (Cont.) SOV/1589

Card 5/8

RYABCHIKOV, D.I., prof., otv. red.; ALIMARIN, I.P., red.; ZAOZERSKIY, I.N., doktor khim. nauk, red.; KOGLYAROV, R.V., kand. khim. nauk, red.; KUZNETSOV, V.I., doktor khim. nauk, red.; SENYAVIN, M.M., kand. khim. nauk, red.; SKLYARENKO, Yu.S., kand. khim. nauk, red.; TRIFONOV, D.N., red. izd-va.; LEVI, T.G., red. izd-va, red.; MARKOVICH, S.G., tekhn. red.

[Rare earth elements; extraction, analysis, uses] Redkozemel'nye elementy; poluchenie, analiz, primenenie. Moskva, 1958. 331 p. (MIRA 11:12)

1. Akademiya nauk SSSR. Institut geokhimii i analiticheskoy khimii.
2. Chlen-korrespondent AN SSSR (for Alimarin).

(Rare earth metals)

—RYABCHIKOV, D. I.

5(2); 21(5) PHASE I BOOK EXPLOITATION SOV/1900

Akademiya nauk SSSR. Komissiya po analiticheskoy khimii

Primeneniye radioaktivnykh izotopov v analiticheskoy khimii (Use of Radioactive Isotopes in Analytical Chemistry) Moscow Izd-vo AN SSSR, 1958. 366 p. [Series: Its: Trudy, t. 9 (12)] Errata slip inserted. 3,000 copies printed.

Resp. Ed.: I.P. Alimarin, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: A.N. Yermakov; Tech. Ed.: T.V. Polyakova.

PURPOSE: The book is intended for chemists and chemical engineers concerned with work in analytical chemistry.

COVERAGE: The book is a collection of the principal papers presented in Moscow at the Second Conference on the Use of Radioactive Isotopes. The problems discussed at the Conference included coprecipitation, aging, and solubility of precipitates, determination of the instability constants

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of complex compounds, separation of rare earth metals, and ion-exchange chromatography. No personalities are mentioned. There are 351 references, 175 of which are Soviet, 33 German, 19 French, 8 Swedish, 2 Hungarian, and 2 Czech.

TABLE OF CONTENTS:

Use of Radioactive Isotopes (Cont.) SOV/1900

(6)

Card 8/10

RYABCHIKOV, D. I., SENYAVIN, M. M., and SKLYARENKO, Yu. S.

"Separation of Individual Rare Earth Elements."

paper to be presented at 2nd UN Intl.' Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sept 58.

AUTHORS: Ryabchikov, D.I., Privalova, M.M. SOV/78-3-7-39/44

TITLE: The Extraction of Tri- and Pentavalent Antimony in Oxygen-Containing Solvents (Ekstraktsiya trekh- i pyativalentnoy sur'my kislorodsoderzhashchimi rastvoritelyami). I. Extraction From a Hydrochloric Acid Medium (I. Ekstraktsiya iz solyanokislov sredy)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol. 3, Nr 7, pp 1694-1702 (USSR)

ABSTRACT: The behavior of solvents containing oxygen during the extraction of tri- and pentavalent antimony from media of hydrochloric acid was investigated by means of the radioactive isotope Sb^{124}. It was found that by p-amyl-, iscamyl-, p-hexyl-, and p-octyl alcohols Sb^{V} is completely extracted from acid hydrochloric acid solutions. On the other hand, the extraction of Sb^{III} is not complete. Mixed esters like amyl acetate and benzyl acetate extract very well, but only Sb^{V} and partly also Sb^{III}. Tributyl phosphate extracts Sb^{V} completely in the course of a further concentration range of hydrochloric acid (4-11 mol). From 1-7 mol hydrochloric acid solution tributyl phosphate extracts also Sb^{III}. By means of the solvents n-butyl- and β, β'-dichlorodiethylene Sb^{V} is

Card 1/2

extracted nearly completely from hydrochloric acid media the molecular concentration of which is more than 9. Under similar conditions only very small quantities of Sb^{III} are extracted. From a hydrochloric acid medium with a molecular concentration of more than 11, Sb^{V} is completely extracted by means of diisoamyl ester; Sb^{III} cannot be extracted in all intervals. Thus, diisoamylester is suited as an extracting agent for the separation of tri- and pentavalent antimony. There are 10 figures and 32 references, 10 of which are Soviet.

SUBMITTED: June 15, 1957

1. Antimony--Solvent extraction 2. Solvent extraction --Effectiveness 3. Organic solvents--Performance 4. Antimony isotopes(Radioactive)--Applications

Card 2/2

RYABCHIKOV D. I.

Card 3

62-58-4-30/32

AUTHOR: None given

TITLE: Anniversary Session of the Department for Chemical Sciences of the AS USSR on October 30 and 31, 1957, and General Meeting of the Department for Chemical Sciences on December 19 and 20, 1957 (Yubileynaya sessiya otdeleniya khimicheskikh nauk Akademii nauk SSSR ot 30-31 oktyabrya 1957 g.i obshcheye sobraniye otdeleniya khimicheskikh nauk 19-20 dekabrya 1957 g)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Khimicheskikh Nauk, 1958, Nr 4, pp. 521 - 524 (USSR)

ABSTRACT: On the occasion of the 40th anniversary of the October Revolution a reunion meeting of the Department for Chemical Sciences of the AS USSR took place. In his opening speech N. N. Semenov pointed out the outstanding succes of the USSR in the field of sciences especially in that of chemistry. Scientific lectures of the sessions were held by the following scientists, as was mentioned already earlier: Knunyants, Member, Academy of Sciences, and A. V. Fokin on the "Nitration of Fluorofines", A. L. Midzhoyan, Member, AS Armenian SSR,

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Anniversary Session of the Department for Chemical Sciences of the AS USSR on October 30 and 31, 1957, and General Meeting of the Department for Chemical Sciences on December 19 and 20, 1957.

on the "Investigations in the Field of the Synthesis of Physiologically Active Compounds", R. Kh. Freydlina, Doctor of Chemical Sciences, reported on the "Investigation of the Telomerization Reaction and the Reaction of the Synthesis on the Basis of Telomers"(Reference 2). B. A. Dolgoplosk, Doctor of Chemical Sciences, spoke on the "Generation of Free Radicals in Solutions and Their Reactions in Model Systems," A. M. Frumkin, Member of the Academy of Sciences, reported on "Some General Problems of Electrochemical Kinetics and the Theory of Ion Reactions"(Reference 4), A. V. Kiselev, Doctor of Chemical Sciences (Reference 5) spoke on "Some Problems of Adsorption Theory", N. M. Emanuel'(Reference 6), Doctor of Chemical Sciences, reported on "New Problems in the Field of Chain Reactions", V. L. Tal'rose, Candidate of Chemical Sciences, spoke on mass-spectroscopic investigations of ion-and radical reactions, A. P. Rebinder, Member,

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Anniversary Session of the Department for Chemical Sciences of the AS USSR on October 30 and 31, 1957, and General Meeting of the Department for Chemical Sciences On December 19 and 20, 1957

Academy of Sciences, drew conclusions with regard to the development of physico-chemical mechanics(Reference 7). I. V. Tananayev, Corresponding Member of the AS USSR, gave new data on the chemistry of some rare elements, D. I. Ryabchikov and others spoke on the "Problems of the Chemistry of Rare Earth Elements"; the final lecture was that of V. A. Sokolov, Doctor of Chemical Sciences,on the "Calorimetric Measurements at High Temperatures".
General Regular Meeting of the Department for Chemistry of the AS USSR (December 19 - 20,1957):A. I. Brodskiy,Corresponding Member, AS USSR,spoke on the "Investigation of Some Reactions of Peroxides and Peracids of Hydrogen by Means of the Isotopic Method",M. M. Shemyakin, Corresponding Member, AS USSR, spoke on the "Use of N^{15} for the Explanation of the Mechanism of Some Organic Reactions", O. A. Reutov,Doctor of Chemical Sciences,reported on the "Investigation of the

62-58-4-30/32

Anniversary Session of the Department for Chemical Sciences of the AS USSR on October 30 and 31, 1957, and General Meeting of the Department for Chemical Sciences On December 19 and 20, 1957

Electrophil and Homolytical Reactions of the Substitution in the Carbon Atom by Means of the Method of Isotope Exchange", I. P. Alimarin, Corresponding Member, AS USSR, reported on new methods of determination of the division of rare elements using organic derivative sulfuric-, selenic- and telluric acids, V. G. Levich, Doctor of Chemical Sciences, reported on the "Diffusion Kinetics of Heterogenous Chemical Reactions in mobile Liquids". There are 8 references, all of which are Soviet.

AVAILABLE: Library of Congress

1. Chemical industry—USSR

Card 4/4

79-13-2-1/27

AUTHORS: Ryabchikov, D. I., Borisova, L. V.

TITLE: Investigation of Molybdenum and Rhenium Sorption on EDE -10 Anionite From Various Mediums and Chromatographic Separation of These Elements (Izucheniye sorbtsii molibdena i reniya iz razlichnykh sred na anionite EDE -10 i ikh khromatograficheskoye razdeleniye)

PERIODICAL: Zhurnal Analiticheskoy Khimii, 1958, Vol. 13, Nr 2, pp. 155-161 (USSR)

ABSTRACT: Rhenium does not form independent minerals as, in consequence of its physical and chemical similarity to molybdenum it usually accompanies molybdenum in nature. Because of the chemical similarity of molybdenum and rhenium their separation is difficult. The separation can be achieved on the strength of the different degree of stability of different valence states of these elements. Beside many other methods which differ in principle (Refs 1 - 18) also chromatographic methods were recently used for their separation. Different adsobents were used here by different authors (Refs 19-23). In recent time the anionite "Dowex 1" was used for the separation of molybdenum and rhenium (Refs 25, 26). In most in-

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Investigation of Molybdenum and Rhenium Sorption on [illegible] 10 Anionite From Various Mediums and Chromatographic Separation of These Elements

vestigations of this kind the determination of molybdenum and rhenium was carried out in the filtrates for the setting up of the elution curves by means of ordinary analytical methods. Only in few cases (Ref 27) radioactively labelled atoms were used for the determination, which permit to register the course of the separation quickly and accurately. The authors used the anionite EDE-10 for their studies on the chromatographic separation of molybdenum and rhenium which is characterized by high exchange capacity, chemical stability, and mechanical stability and can be used within a wide pH-range. The investigations were carried out in HCl, HNO_3, H_2SO_4 and H_3PO_4 as media, Re^{186} and Mo^{99} serving as radioactive isotopes. The radiation of Mo^{99} was measured through a lead filter (Ref 18), in order to eliminate the disturbing influence of technetium which is radioactive as well. It develops from molybdenum by emission and is therefore in equilibrium with it: $Mo^{98}(n,\gamma)\ Mo^{99} \xrightarrow{\beta^-} Te^{99m}$. In hydrochloric, to a noticeable degree nitric, and sulfuric acid solution molybdenum and rhenium are adsorbed only in a concentration interval of 0,4 - 0,5 whereby, however, no obvious difference in the adsorption of these elements can be

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Investigation of Molybdenum and Rhenium Sorption on ...10 Anionite From Various Mediums and Chromatographic Separation of These Elements

found. In phosphoric acid solutions, however, a great difference in the adsorption is exhibited by molybdenum and rhenium. This is obviously due to the fact that molybdenum forms an anionic complex in phosphoric acid solution which is well adsorbed by the active groups of the exchange resin. This fact was used for the separation of molybdenum and rhenium in synthetic mixtures and also in natural objects with different concentration ratio of the two components. The greatest difference in the adsorptions occurs in a 2 molar phosphoric acid solution in which molybdenum is adsorbed to an extent of 72,8 %, rhenium, however, only to an extent of approximately 4 %. An exchange column is used from which rhenium is eluted by means of a 2 molar phosphoric acid solution and molybdenum with a 10 % soda lye. It was found by electrophoreses with the help of the radioactive isotope Re^{186} that rhenium in the case of washing out with phosphoric acid is absorbed by the filtrate, though it is an anion. Rhenium is here obviously dislocated by the phosphoric acid from the adsorbent. This assumption was proved experimentally.

Investigation of Molybdenum and Rhenium Sorption on 75-13-2-1/27
Various Mediums and Chromatographic Separation of These Elements 10 Anionite From

The adsorption of rhenium decreases with increasing concentration of the phosphate ions. It was shown that this separation method can be well used also for the separation of rhenium from molybdenites and from technetium which was produced by the radioactive decay of molybdenum. The experimental conditions of the investigations carried out are described precisely. There are 6 figures, 3 tables, and 34 references, 10 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo AN SSSR, Moskva
(Moscow Institute for Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy, AS USSR)

SUBMITTED: October 26, 1957

1. Molybdenum--Absorption 2. Molybdenum--Adsorption 3. Rhenium --Adsorption 4. Rhenium--Absorption 5. Molybdenum--Separation 6. Rhenium--Separation

Card 4/4

AUTHORS: Ryabchikov, D. I., Borisova, L. V. 75-13-3-16/27

TITLE: Chromatographic Separation of Cobalt and Nickel in the Analysis of Ores and Alloys (Khromatograficheskoye razdeleniye kobal'ta i nikelya pri analize rud i splavov)

PERIODICAL: Zhurnal analiticheskoy khimii, 1958, Vol 13, Nr 3, pp 340-343 (USSR)

ABSTRACT: Besides various chemical methods (references 1-8), methods of ion-exchanger chromatography were recently also successfully employed (reference 9) in the analysis of ores and alloys. Anion-exchangers by which the metals present in the form of complex anions are retained, are with special success used for this. Anion exchangers permit the frequent performance of the separation within a shorter period than cation exchangers, as the desorption of the complex anions adsorbed from the medium of a strong electrolyte can simply be effected by a change of concentration of the electrolyte or by means of water. Of the domestic exchanger brands the types EDE-10 (condensation product of ethylenediamine and epichlorohydrin) and AN-2F (condensation product of polyethylenediamine, phenol and formaldehyde) proved to be especially good. Of foreign brands the American types

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Dowex 1, Dowex 2 and Amberlite IRA-400 are especially widespread. In the present paper the separation of cobalt and nickel in a hydrochloric solution by means of the anionite EDE -10 is described. For this the data were used which are known for the adsorption of cobalt and nickel at the anionite Dowex 1 (reference 11). Cobalt is most intensively adsorbed from a 9n hydrochloric acid solution where the stable anion $[CoCl_4]^{2-}$ is present. In the entire concentration range of hydrochloric acid (0,1 to 12n) nickel does not form any complex anions in an amount worth mentioning. For comparing the adsorptive capacity of the anionites Dowex 1 and EDE -10 the radioactive isotopes Co^{60} and Ni^{65} were used. After all nickel had been washed out, the adsorbed cobalt was washed out with 0,5n HCl. On this occasion the anion $[CoCl_4]^{2-}$ is decomposed and cobalt goes into the filtrate as cation. It became evident that a complete separation of cobalt and nickel is attained at both investigated exchangers. The two elements can be quantitatively washed out of the exchanger, therefore no loss occurs. Thus also larger amounts of cobalt and nickel can be separated by means of anionites. A

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Chromatographic Separation of Cobalt and Nickel in the Analysis of Ores and Alloys 75-13-3-16/27

working prescription for the determination of cobalt and nickel in ores and alloys was worked out. On this occasion the two elements are, before the determination, separated from the other elements by means of dithiooxamic acid. If copper is present (reference 12), it is not precipitated. However, it does not disturb the determination, as its complex chloride-anion is fairly resistant to diluted hydrochloric acid. In this case cobalt is washed out with 4n HCl and then copper is removed by washing with 2,5n HCl. Iron is in the precipitation with dithiooxamic acid masked by citric acid and remains in the filtrate, if the precipitate is carefully washed. The performance of the analysis of ores and alloys for determining the content of cobalt and nickel is described in detail. There are 3 figures, 3 tables, and 12 references, 8 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V.I. Vernadskogo AN SSSR, Moskva (Moscow Institute of Geochemistry and Analytical Chemistry imeni V.I. Vernadskiy, AS USSR)

Card 3/3 1. Cobalt---Determination 2. Nickel---Determination

AUTHORS: Ryabchikov, D. I., Borisova, L. V. SOV/75-13-4-22/29

TITLE: The Chromatographic Separation of Rhenium and Tungsten (Khromatograficheskoye razdeleniye reniya i vol'frama)

PERIODICAL: Zhurnal analiticheskoy khimii, 1958, Vol. 13, Nr 4, pp. 492-493 (USSR)

ABSTRACT: Rhenium and molybdenum differ greatly in the adsorption at the anionite EDE -10 from phosphoric acid solution (Ref 1). Hexavalent molybdenum with phosphoric acid forms heteropoly compounds in which molybdenum is present as complex anion and therefore is adsorbed well at the anionite. Rhenium in heptavalent form does not produce such compounds and passes into the filtrate on the washing of the column with a 2 m phosphoric acid solution. As tungsten like molybdenum tends to form heteropoly compounds rhenium can this way be separated from tungsten. The determinations were carried out on an anionite of the type EDE-10 (in phosphoric acid form). The radioactive isotopes W^{185} and Re^{186} served as indicators. The mixtures of tungsten and rhenium (as tungstenate or perrhenate, respectively) were brought to the upper end of the column; the rhenium was washed

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The Chromatographic Separation of Rhenium and Tungsten

out with 2 m phosphoric acid. The progress of the washing out was controlled by the measurement of the activity of Re^{186} in the filtrate as well as by means of the color reaction with tin(II)chloride and potassium thiocyanate. After the washing out of rhenium the column was washed with water, then the tungsten was washed out with a 10% soda lye. The end of the washing out was determined by the lack of the activity of W^{185} in the last parts of the filtrate as well as by the negative reaction with potassium thiocyanate. The curves for the eluation of rhenium and tungsten were plotted from the results obtained from the activity measurements of the single parts of the filtrate as well as from the changes of the intensity of color of these parts. The complete washing out of Re^{186} and W^{185} was determined by means of the summing up of the activities of the single portions of the filtrate; besides, rhenium was determined quantitatively in the filtrate by means of nitron acetate and tungsten the photometrical way on the basis of the reaction with potassium thiocyanate. The results for various concentration ratios of tungsten and rhenium (1 000:1, 1:1, 1:400) show that by means of this method rhenium may well be separated

SOV/75-13-4-22/29

The Chromatographic Separation of Rhenium and Tungsten

from tungsten. There are 1 figure, 1 table, and 6 references, 5 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo AN SSSR, Moskva (Institute of Geochemistry and Analytical Chemistry Moscow AS USSR imeni V. I. Vernadskiy

SUBMITTED: October 28, 1957

1. Rhenium--Separation 2. Tungsten--Separation 3. Radioisotopes --Applications 4. Chromatographic analysis--Applications

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RYABCHIKOV, D. I.

5(2) PHASE I BOOK EXPLOITATION SOV/2402

Akademiya nauk SSSR. Institut geokhimii i analiticheskoy khimii

Redkozemel'nyye elementy; polucheniye, analiz, primeneniye (Rare Earth Elements; Production, Analysis, and Use) Moscow, Izd-vo AN SSSR, 1959. 331 p. 5,000 copies printed.

Resp. Ed.: D. I. Ryabchikov, Professor; Eds. of Publishing House: D. N. Trifanov and T.G. Levi; Tech. Ed.: S. G. Markovich; Editorial Board: I. P. Alimarin, Corresponding Member, USSR Academy of Sciences, I. N. Zaozerskiy, Doctor of Chemical Sciences, R. V. Kotlyarov, Candidate of Chemical Sciences, V. I. Kuznetsov, Doctor of Chemical Sciences, M. M. Senyavin, Candidate of Chemical Sciences, and Yu. S. Sklyarenko, Candidate of Chemical Sciences.

PURPOSE: This book is intended for chemists in general and for geochemists and analytical chemists in particular.

COVERAGE: This collection of articles consists of reports presented at the Rare Earth Elements Symposium held in June 1956 at the Institute of Geochemistry

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Rare Earth Elements (Cont.)

and Analytical Chemistry imeni V. I. Vernadskiy. The book may be divided into three sections: the characteristics, uses and production of rare earth elements (REE); the methods of analyzing REE; and the application of individual rare earth elements and REE mixtures in the glass and metallurgical industries, and their use as catalysts. Considerable space is devoted to the application of ion-exchange chromatography in the production of pure forms of all rare earth elements. The combinations of this method with other methods in separating REE on an industrial scale are discussed by D. I. Ryabchikov, Yu. S. Sklyarenko, and M. M. Senyavina. Chemical methods of separating REE compounds are discussed by I. N. Zaozerskiy (who is said to be the first in the USSR to develop methods of processing REE), A. V. P. Kotlyarov, Z. F. Andreyeva, A. V. Nikolayev, and G. P. Aleksandrov. Quantitative X-ray spectral analytical methods are described by E. Ye. Vaynshteyn, and chemical methods of analysis by I. P. Alimarin and F. I. Pavlotskaya. The determinations of REE impurities in pure products and atomic materials are discussed at length in three articles by A. N. Zaydel' and his associates. All articles are accompanied by photographs, diagrams, tables, and bibliographic references.

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RYABCHIKOV, D. I.

PHASE I BOOK EXPLOITATION SOV/5084

International Conference on the Peaceful Uses of Atomic Energy. 2d, Geneva, 1958.

Doklady sovetskikh uchenykh. [t.4] Khimiya radioelementov i radiatsionnykh prevrashcheniy (Reports of Soviet Scientists. v. 4.: Chemistry of Radio-elements and Radiation Transformations) Moscow, Atomizdat, 1959. 323 p. 8,000 copies printed. (Series: Its: Trudy)

Ed. (Title page): A. P. Vinogradov, Academician; Ed.: V. I. Labaznov; Tech. Ed.: Ye. I. Mazel'.

PURPOSE: This collection of articles is intended for scientists and engineers interested in the applications of radioactive materials in science and industry.

COVERAGE: The book contains 26 separate studies concerning various aspects of the chemistry of certain radioactive elements and the processes of radiation effect on matter. These reports discuss present-day methods of reprocessing irradiated nuclear fuel, research in the chemistry of mercury, thorium, uranium, plutonium, and americium, problems related to the sorption and burying of radioactive wastes, the radiolysis of aqueous solutions and of organic compounds, the mechanism of polymer chain grafting, and the effect of radiation on natural and synthetic rubbers. V. I. Prusakov edited the present volume. Most of the reports are accompanied by references. Contributors to individual investigations are mentioned in annotations to the Table of Contents.

TABLE OF CONTENTS:

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RYABCHIKOV, D.I.

Chromatographic analysis. Uch.zap. MOPI 84:3-17 '59. (MIRA 14:9)

(Chromatographic analysis)

SOV/78-4-7-43/44

5(2)

AUTHOR: Ryabchikov, D. I.

TITLE: On the Valence State of Metal in Cerium Tetracarbonate (O valentnom sostoyanii metalla v tetrakarbonate tseriya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 7, pp 1698-1699 (USSR)

ABSTRACT: The author criticizes a paper by V. A. Golovnya and L. A. Pospelova (Ref 1), who set up the formula $(CN_3H_6)_5[Ce(CO_3)_4 \cdot 2H_2O]$ for a guanidine complex compound of cerium carbonate as a Ce^{3+}-compound. He mentions data from his own potentiometric titration with Mohr's salt, according to which he suggests the formula for tetravalent cerium: $(CN_3H_6)_4[Ce(CO_3)_4] \cdot 2H_2O$.

There are 1 figure and 5 references, 3 of which are Soviet.

SUBMITTED: December 9, 1958

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SOV/78-4-8-18/43

5(2)
AUTHORS: Ryabchikov, D. I., Yermakov, A. N., Belyayeva, V. K., Marov, I.N.

TITLE: An Investigation of the Complex Formations of Zirconium and Hafnium With Tartaric Acid by Means of the Ion Exchange Method (Izucheniye kompleksoobrazovaniya tsirkoniya i gafniya s vinnoy kislotoy metodom ionnogo obmena)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 8, pp 1814-1826 (USSR)

ABSTRACT: The investigation of the complex formations in aqueous solutions of zirconium and hafnium is rendered difficult by a strong tendency of these elements towards hydrolysis and polymerization. Therefore, the usual physico-chemical methods cannot be applied. For this reason the ion exchange method, the investigation of the equilibrium distribution of an element between two phases of a heterogeneous system are suggested. This relatively new method is described in detail on the basis of publication data. The authors used $Zr^{95}+Nb^{95}$ for their own experiments. In this case the softer β-radiation of Nb^{95} was absorbed by an aluminum filter, moreover Hf^{181} and the cation exchanger KU-2.

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The solution was buffered with $NaClO_4$. By means of experiments it was found that in the case of a concentration of 2 - 1.3 mol hydrogen ions per liter no hydrolysis or polymerization takes place. The following is assumed to be the probable reaction of the complex formation of Zr and Hf with tartaric acid: $Me^{4+} + H_2tart \rightleftarrows MeH_{2-n}tart^{4-n} + nH^+$. The distribution coefficient was computed and its dependence on the ratio $\frac{v}{m}$ (Table 3 v = volume of the solution, m = weighed portion of the cation exchanger) was determined. Moreover, the number of hydrogen ions released from tartaric acid in the complex formation was determined (Fig 5). The complex compounds of hafnium are more stable than those of zirconium (Tables 3, 4). A sorption of ions of the type $MeHtart^{3+}$ or $Metart^{2+}$ was not observed. Probably they do not take place due to steric factors or the weakening of the ionic charge in consequence of the linkage with the oxy groups of tartaric acid. There are 5 figures, 4 tables, and 38 references, 10 of which are Soviet.

SUBMITTED: April 16, 1959

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SOV/78-4-9-9/44

5(2)

AUTHORS: Ryabchikov, D.I., Sklyarenko, Yu. S., Stroganova, N. S.

TITLE: The Electrolytic Reduction of Samarium

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 9, pp 1985-1989 (USSR)

ABSTRACT: A previously published paper by the authors (Ref 1) treats of the electrolysis of ytterbium acetate on a mercury electrode in the presence of potassium citrate. In connection with certain interrelations found thereby the electrolysis of samarium acetate was investigated in the present article, as but few references on this subject are found in publications (Refs 2-7), and low yields (maximum 47%) are stated in these reports. The following relations were investigated. 1) The influence of the acidity on the yield (Table 1, Fig 1). It was found that Sm is not reduced below pH 3.0, that the reduction reaches a maximum between pH 3.5 and 4.5, and that a pE of over 4.5 does not influence the reaction. 2) The influence of the potassium citrate concentration (Table 2, Fig 2) was found to be analogous to that in ytterbium reduction: the maximum yield was obtained at a ratio $Me^{3+} : Cit^{3-} = 1 : 2$ and dropped at high citrate concentrations owing to the formation of complex ions

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$[Me(Cit)_2]^{3-}$. 3) The influence of the initial concentration of Sm (Table 3, Fig 3) was evident in yields rising with increasing concentration. 4) The influence of temperature was also investigated (Table 4, Fig 4). A temperature rise produced a lower yield. Thus, a considerable similarity to ytterbium was found, and an 86.6% yield of samarium attained. There are 4 figures, 4 tables, and 7 references, 1 of which is Soviet.

SUBMITTED: June 7, 1958

66297
SOV/78-4-12-5/35

~~5(2)~~ 5.2300

AUTHORS: Ryabchikov, D. I., Sklyarenko, Yu. S., Stroganova, N. S.

TITLE: Electrolytic Reduction of Europium

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 12, pp 2682-2687 (USSR)

ABSTRACT: In an earlier paper (Refs 1, 2) the authors put forward various assumptions on the chemical processes taking place in the electrolytic production of ytterbium- and samarium amalgam from the acetates of these rare earths in the presence of potassium citrate. The assumptions proved to be useful since the yield of these rare earths could thus be increased. By this process europium can be produced easily and with sufficiently high yield. However, its reduction was studied especially to indicate the common character of this process for all three rare earths, and to detect individual differences. The investigations concerned the following problems: 1) the effect of the electrolyte acidity upon the yield in europium (Table 1, Fig 1). With pH = 3 no Eu amalgam is formed as yet. Between 3.0 - 3.8 the yield rapidly increases; afterwards it slowly rises up to a pH-value of 5.0; the further pH-rise does not affect it. 2) The effect of the addition of potassium citrate upon the Eu

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Electrolytic Reduction of Europium

yield (Table 2, Fig 2). Data indicate that Eu amalgam, but, only with a yield of about 70%, can be produced from the acetate solution even without any addition of potassium citrate. The yield is independent of the citrate concentration within a wide range (Eu^{3+} : Cit^{3-} between 1 : 2 and 1 : 6). 3) The effect of the initial concentration of Eu on the yield (Table 3, Fig 3). The yield is increased but little by higher Eu concentration. 4) The effect of temperature on the Eu yield (Table 4, Fig 4). Maximum yield is attained between 0 and 5°, further temperature rise reduces the yield. Corresponding data for Yb, Sm, and Eu are listed in tables 5-8. They indicate that under equal conditions of electrolysis the yield increases in the order Sm - Yb - - Eu. A modification of the experimental conditions has the same effect on all the three elements so that the chemical processes with the three elements are likely to follow the same scheme. The intensity of the effect of the individual factors, however, is different. Yb offers maximum yield at an optimum pH whereas the yield of Sm and Eu is fairly independent of the pH within a wide range. For Sm and Yb there exists an optimum citrate concentration, while the Eu yield is hardly affected by the latter. The authors are studying the possibilities of employing these deviations of the behavior of the three rare

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Electrolytic Reduction of Europium SOV/78-4-12-5/35

earths for an electrolytic separation of these elements. There are 4 figures, 8 tables, and 6 references, 4 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo Akademii nauk SSSR
(Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy of the Academy of Sciences, USSR)

SUBMITTED: July 12, 1958

Card 3/3

REABCIKOV, D.I. [Ryabchikov, D.I.]

On the structure of the complex compounds of dipyridine, dihalogens, and dithiocyanates of zinc. Studii chimie Iasi 10 no.1:35-40 '59. (REAI 9:5)

(Complex compounds) (Zinc) (Bipyridine) (Halogens) (Thiocyanates)

RYABCHIKOV, D.I.

Ion-exchanging resins and their use. Khim. v shkole 14 no.1:30-40 Ja-F '59. (MIRA 12:2)
(Gums and resins, Synthetic)

RYABCHIKOV, D. I.

AUTHOR: Bilimovich, G. N. SOV/75-14-4-30/30

TITLE: Section of Analytical Chemistry of the VIII Mendeleyev Congress on General and Applied Chemistry

PERIODICAL: Zhurnal analiticheskoy khimii, 1959, Vol 14, Nr 4, pp 511-512 (USSR)

ABSTRACT: Approximately 300 persons participated in the work of the
Department of Analytical Chemistry, among them representatives
of various scientific research institutes, higher schools and
industrial enterprises in Russia, scientists from China,
Bulgaria, the ČSR, Poland, Hungary, and Italy. Approximately 70
reports were heard. In his opening speech I. P. Alimarin reported
on the achieved results and on modern problems of analytical
chemistry. I. V. Tananayev reported on the application of physico-
chemical analysis in heterogeneous systems for the solution of a
series of problems of analytical chemistry. V. I. Kuznetsov
reported on modern aims in the use of organic reagents;
A. K. Babko showed at the example of halide and thiocyanate
complexes the correlation between the stability of complexes and
the position of the corresponding central atoms in the periodic
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system. V. M. Peshkova and V. M. Bochkova lectured on the stability
of oximates of Cu, Co, and Ni as depending on the structure of
the oxime molecule. V. V. Toropova lectured on the double
character of reaction of some compounds in the formation of
complexes. The problem of the application of heteropolyacids in
analytical chemistry was dealt with in the lectures of
Z. F. Shakhova and co-workers, and A. I. Kokorin and N. A.
Polotebnova. A large number of lectures dealt with the use of
new organic reagents in analysis: A. I. Busev and M. I. Ivanyutin
reported on the application of dialkyl and diaryl dithio-
phosphoric acid for the separation of elements, A. I. Portnov used
aryl arsonic acid and aryl phosphinic acid. R. P. Lastovskiy and
his co-workers treated some properties of new complexons. The
lectures of V. A. Nazarenko, G. G. Shitareva and A. I. Kononenko
dealt with the photometric determination of a series of elements
using fluorine derivates. A. I. Cherkesov lectured on the use of
halochromation in analytical chemistry. B. M. Dobkina and T. M.
Malyutina lectured on the determination of tantalum using
differential spectrophotometry. Yu. V. Morachevskiy and L. A.
Stolyarova reported on new highly sensitive analysis methods
using an ultraviolet microscope. Several lectures dealt with
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methodical and theoretical problems of spectrum analysis
(N. F. Zakhariy and G. A. Sheynin; E. Ya. Vaynshteyn and
co-workers). N. S. Poluektov and M. N. Nikonova treated the
perfection of flame photometry. Several lectures dealt with the
determination of elements by polarography (S. I. Sinyakova;
N. B. Rozhdestvenskaya and I. A. Yarovoy; Ya. P. Gokhshteyn). New
results in using fixed electrodes were reported by I. D.
Panchenko and Yu. S. Lyalikov and co-workers. The lecture of
N. I. Udal'tsova and P. N. Paley treated the use of amperometric
titration with two electrodes in the chemistry of uranium and
thorium. N. M. Senyavin showed possibilities of predicting the
conditions of chromatographic separation of elements based on
their position in the periodic system. T. A. Belyavskaya reported
on the use of ion exchange in the investigation of the state of
substances in solutions. A. S. Vernidub and V. I. Petrashen'
lectured on the chromatographic separation of a series of
elements, N. G. Polyanskiy reported on adapting the properties
of ion exchanger resins, F. M. Shemyakin and associates reported
on the chromatographic proof of sulfanilamide preparations in
liquids of the organism. G. L. Starobinets and associates treated
Card 3/4
the application of high polymers in chromatographic analysis.
The lecture of A. A. Zhukhovitskiy and N. M. Turkel'taub, G. Shay
dealt with gas chromatography. Several lectures treated the use of
radioactive isotopes for the chromatographic investigation of
complex formation (D. I. Ryabchikov and associates), for the
investigation of the co-precipitation mechanism of ions of rare
metals with sulfides (M. A. Rudnev) and for determining rare
elements by means of isotope dilution (I. P. Alimarin, G. N.
Bilimovich). In the field of elementary organic microanalysis
the lectures of M. O. Korshun, N. E. Gel'man and V. A. Klimova with
associates have to be mentioned, who treated the elaboration of
rapid micromethods for the simultaneous determination of several
elements from one weighed portion of boron, fluorine and
silicium-organic compounds.

5(2)
AUTHORS: Ryabchikov, D. I., Gol'braykh, Ye. K. (Moscow) SOV/74-28-4-3/6

TITLE: Thorium and Its Compounds (Toriy i yego soyedineniya)

PERIODICAL: Uspekhi khimii, 1959, Vol 28, Nr 4, pp 408-435 (USSR)

ABSTRACT: In this paper the authors report on the discovery of thorium and characterize the element and its compounds. Until recently thorium was considered as belonging to the IV sub-group of the periodic system but at present it is placed to the actinide. So far there are no definite proofs as to the electron configuration of the thorium atom. In principle, the electron distribution of thorium may be considered as being within the limits of the Radon configuration: $6d^2 7s^2$ or $5f6d7s^2$ (Refs 14 to 16). Still, it has not been found out so far with which element of the actinide series the first 5f electron appears (Refs 10, 12, 17, 18). This fact and some others at the moment do not prove the presumption that the second series of the transition elements exactly begins with thorium (Refs 3, 19, 20). In spite of the fact that metallic thorium was for the first time obtained as long as 100 years ago

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industrial production of the pure metal was not feasible until 1939. In principle, the technology of thorium production consists of several stages - decomposition of monazite and dissolution of thorium, preparation of pure thorium compounds and their reduction up to metal. Thorium is a silver-colored metal gradually becoming darker in air. Metallic thorium is pyrophorous and is therefore kept under a petroleum layer. The specific weight depends on the ThO_2-content. The highest specific weight of the pure metal ranges within the limits between 11.25 - 11.7 g/cm^3. Different values are given for its melting point, probably because of a varying ThO_2-content. It is most probable that the melting point of the pure metal is in the range between 1650-1800° (Ref 55). For the boiling point values between 3000 and 5200° were found. Its evaporation heat is 145 and 177 large caloric/mol. The heat conductivity is 0.32 watt. $cm^{-1}.degree^{-1}$ at 100° and 0.35 $watt.cm^{-1}.degree^{-1}$ at 300°. In heating in air the chip of metallic thorium burns up and

forms thorium dioxide ThO_2. Metallic thorium reacts energetically with hydrogen, nitrogen, halides, sulphur, silicon, aluminum, and other elements at considerably high temperatures. It dissolves quickly in 6-12 N hydrochloric acid and forms thorium chloride. A part of the substance, however, remains undissolved. The investigation of the structure of this residue has shown that it has a cubic structure similar to the structure of oxides and mononitrides. A complete dissolution of the metal is obtained if it is treated with hydrochloric acid containing traces of fluoride or fluosilicate. Thorium forms a great number of hydrates because it has a high charge (4+) and a comparatively small length of the ionic radius (0.99 Å). It also has a strong trend towards the formation of complex compounds with the anions of various salts: nitrates, sulphates, sulphites, carbonates, fluorides, iodates, bromates, chlorides and chlorates, oxalates, tartrates, citrates, etc. Moreover, it forms complexes with diketones of the type of acetyl acetone. Numerous complex compounds were extracted by various solvents. The maximum value of the coordination

number of thorium in aqueous solution obviously equals 8. Thorium is of great importance in the production of refractory alloys. It easily forms alloys with aluminum, iron, copper, cobalt, nickel, gold, silver, boron, platinum, molybdenum, tungsten, tantalum, zinc, bismuth, lead, mercury, sodium, beryllium, silicon, and selenium. Thorium does not form amalgam with mercury because its solubility in mercury is very low and amounts to only 0.0154 %. Thorium was used very much in the industry in the years 1880 to 1890 when it was used in the production of incandescent gas lamps. After electricity had been introduced in economy it was scarcely noticed for a considerable amount of time and did not gain its practical importance until 1940, above all in the field of investigations of nuclear energy. In conclusion, this paper gives the synthesis methods of thorium compounds and their characteristics. Table 1 - radioactive series of thorium, table 2 - radioactive properties of the thorium isotopes, table 3 - interaction of thorium with organic acids. There are 3 tables and 311 references, 28 of which are Soviet.

Ryabchikov, D.I.

PHASE I BOOK EXPLOITATION SOV/4443

Akademiya nauk SSSR. Komissiya po analiticheskoy khimii

Metody opredaleniya primesey v chistykh metallakh (Methods of Determining Admixtures In Pure Metals) Moscow, 1960. 411 p. (Series: Its: Trudy, 12) 3,500 copies printed.

Resp. Eds.: A.P. Vinogradov, Academician, and D.I. Ryabchikov, Doctor of Chemical Sciences; Ed. of Publishing House: M.P. Volynets; Tech. Ed.: T.V. Polyakova.

PURPOSE: This collection of articles is intended for chemists, metallurgists, and engineers.

COVERAGE: The articles describe methods for detecting and determining various admixtures and their traces in pure metals. Also discussed are many chemical, physicochemical, electrochemical, spectrochemical and luminescence methods of analyzing materials of high purity. The editors state that these methods have been developed within the last five or six years by various Soviet scientific institutes, and are now widely used in research and factory laboratories of the Soviet Union. No personalities are mentioned. References, mostly Soviet, accompany each article.

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Ryabchikov, D.I.

PHASE I BOOK EXPLOITATION SOV/3443

Akademiya nauk SSSR. Komissiya po analiticheskoy khimii

Metody opredeleniya primesey v chistykh metallakh (Methods of Determining Admixtures In Pure Metals) Moscow, 1960. 411 p. (Series: Its: Trudy, 12) 3,500 copies printed.

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Ryabchikov, D.I.

PHASE I BOOK EXPLOITATION SOV/4164

Vsesoyuznoye soveshchaniye po splavam redkikh metallov. 1st, Moscow, 1957

Redkiye metally i splavy; trudy... (Rare Metals and Alloys: Transactions of the First All-Union Conference on Rare-Metal Alloys) Moscow, Metallurgizdat, 1960. 438 p. 3,150 copies printed.

Sponsoring Agencies: Akademiya nauk SSSR. Institut metallurgii; USSR Komissiya po redkim metallam pri nauchno-tekhnicheskom komitete.

Ed.: I.I. Shapovalov; Ed. of Publishing House: O.M. Kamayeva; Tech. Ed.: P.G. Islent'yeva.

PURPOSE: This collection of articles is intended for metallurgical engineers, physicists, and workers in the machine-building and radio-engineering industries. It may also be used by students of schools of higher education.

COVERAGE: The collection contains technical papers which were presented and dis-
cussed at the First All-Union Conference on Rare-Metal Alloys, held in the In-
stitute of Metallurgy, Academy of Sciences USSR in November 1957. Results of
investigations of rare-metal alloys, titanium, and copper-base alloys with ad-
ditions of rare metals are presented and discussed along with investigations of
rhenium, vanadium, niobium, and their alloys. The effect of rare-earth metals
on properties of magnesium alloys and steels is analyzed. The uses of rhenium
as a dehydrating catalyst, electroplating material, and material suitable for
making plugs for automobile electrical systems are discussed. Also, the ef-
fect of the addition of certain elements on the properties of heat-resistant
steel is examined and alloys with special physical properties (particularly
semiconductive alloys) are discussed. No personalities are mentioned. Soviet
and non-Soviet references accompany some of the articles.

PART II. TITANIUM, AND COPPER-BASE ALLOYS WITH RARE-METAL ADDITIONS

Rare Metals (Cont.) SOV/4164

Card 5/8

PHASE I BOOK EXPLOITATION SOV/4934

Ryabchikov, Dmitriy Ivanovich, and Yevgeniya Kas'yanovna Gol'braykh

Analiticheskaya khimiya toriya (Analytical Chemistry of Thorium) Moscow, Izd-vo AN SSSR, 1960. 295 p. Errata slip inserted. 2,300 copies printed. (Series: Akademiya nauk SSSR. Institut geokhimii i analiticheskoy khimii. Seriya: Analiticheskaya khimiya elementov)

Sponsoring Agency: Akademiya nauk SSSR. Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo.

Chief Ed.: A. P. Vinogradov, Academician; Editorial Board: I. P. Alimarin, A. K. Babko, A. I. Busev, E. Ye. Vaynshteyn, A. P. Vinogradov, A. N. Yermakov, V. I. Kuznetsov, P. N. Paley, D. I. Ryabchikov, I. V. Tananayev and Yu. A. Chemikhov. Eds. of v. "Analiticheskaya khimiya toriya": I. P. Alimarin and P. N. Paley; Ed. of Publishing House: D. N. Trifonov; Tech. Ed.: T. P. Polenova.

PURPOSE: This book is intended for analytical chemists in research institutes and plant laboratories, and for chemistry instructors and students in

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KORENMAN, Izrail' Mironovich; VINOGRADOV, A.P., akademik, glavnyy red.; BUSHEV, A.I., prof., red.toma; ALIMARIN, I.P., red.; BABKO, A.K., red.; VAYNSHTEYN, E.Ye., red.; YERMAKOV, A.N., red.; KUZNETSOV, V.I., prof., red.; PALEY, P.N., red.; RYABCHIKOV, D.I., red.; TANANAYEV, I.V., red.; CHERNIKHOV, Yu.A., red.; VOLYNETS, M.P., red.izd-va; KASHINA, P.S., tekhn.red.

[Analytical chemistry of thallium] Analiticheskaia khimiia talliia. Moskva, Izd-vo Akad.nauk SSSR, 1960. 170 p. (MIRA 14:3)

(Thallium--Analysis)

S/064/60/000/004/019/021/XX
B013/B060

AUTHORS: Ryabchikov, D. I., Kodymskiy, S. A.

TITLE: Use of Anionites for the Purification of Toluene From Free Fatty Acids During the Production of Aluminum Dyes

PERIODICAL: Khimicheskaya promyshlennost', 1960, No. 4, pp. 77-78

TEXT: The authors have worked out a method of purifying toluene from fatty acids with the aid of anionites during the production of aluminum dyes. Experiments were made with anionites of Soviet origin: Н (N), Н-0 (N-0), ММГ-1 (MMG-1), and АН-1 (AN-1) with grain sizes between 1 and 1.5 mm. Their sorption capacity was first determined for individual fatty acids after a 10-hour pre-treatment and a subsequent passage of the acid solutions to be examined (acid number 10 - 25 mg KOH) at a rate of 0.5 ml/min · cm^2 through a chromatographic column. Results obtained show that the sorption capacity of anionites examined differs for different fatty acids. An enlarged chromatographic column (height 1500 mm, diameter 40 mm) was made of molybdenum glass to serve for the

Use of Anionites for the Purification of Toluene From Free Fatty Acids During the Production of Aluminum Dyes

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B013/B060

purification of aliphatic toluene in pilot plant experiments and in experiments of the tsentral'naya laboratoriya Moskovskogo lakokrasochnogo zavoda (Central Laboratory of the Moscow Varnish Color Factory). 400 g of air-dry anionite in OH-form were filled into the column. Pre-treated toluene with a higher fatty acid percentage (up to 5 wt%) and aluminum powder were used in the experiments. As much as 10 kg of aliphatic toluene were purified in such a column within 8 hours. The filtration took place at a rate of 20.8 ml/min. The first experiments have shown that anionites in OH-form effect the complete removal of fatty acid from the toluene solution. It was noted at the same time, however, that a direct filtration of aliphatic toluene is not possible, because the column is clogged by the aluminum powder and stearates. It was found by further lab-experiments that when aliphatic toluene was treated with an aqueous alkaline solution (5% NaOH) both the aluminum powder and part of acid admixtures react with the alkaline solution. Resulting aluminates and salts of fatty acids are removed readily. Toluene pre-treated in this manner and filtered through anionite in OH-form had an acid number of

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Use of Anionites for the Purification of Toluene From Free Fatty Acids During the Production of Aluminum Dyes

S/064/60/000/004/019/021/XX
B013/B060

0.05 mg KOH and could be again used. The fatty acid passed over into the filtrate could also be used again after washing the latter 2 - 3 times with water and after removal of hydrochloric acid traces. The possibility of repeatedly using valuable substances in the production , the relatively simple equipment used, and the low alkali consumption make the method concerned appear expedient. On the strength of the foregoing facts the purification of toluene with the aid of AN-1 anionite is to be preferred to the current use of alkali for purification. V. V. Gusarskiy took part in the laboratory experiments. There is 1 table.

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RYABCHIKOV, D.I.; KODYMSKIY, S.A.

Use of anion exchangers in the removal of free fatty acids from toluene in the process of synthesis of aluminum dyes. Khim.prom. no.4:341-342 Je '60. (MIRA 13:8)

(Toluene) (Acids, Fatty) (Dyes and dyeing)

RYABCHIKOV, D.I.; VAYNSHTEYN, E.Ye.; BORISOVA, L.V.; VOLYNETS, M.P.; KOROLEV, V.V.; KUTSENKO, Yu.I.

Spectrochemical method of determining bismuth, cadmium, antimony, tin and lead in metallic tungsten, niobium and tantalum. Trudy Kom. anal. khim. 12:82-93 '60. (MIRA 13:8)
(Tungsten--Analysis) (Niobium--Analysis)
(Tantalum--Analysis)

RYABCHIKOV, D.I.; BELYAYEVA, V.K.

Determination of small quantities of rare-earth elements in metallic bismuth. Trudy Kom. anal. khim. 12:217-220 '60. (MIRA 13:8)
(Bismuth--Analysis) (Rare earth metals)

RYABCHIKOV, D.I.; GOKHSHTEYN, Ya.P.; BORISOVA, L.V.

Method of direct determination of lead, cadmium, bismuth, antimony and tin in molybdenum by means of oscillographic polarography. Trudy Kom. anal. khim. 12:265-280 '60. (MIRA 13:8)
(Molybdenum--Analysis) (Polarography)

5.2200(D)

68113

SOV/78-5-1-18/45

~~5 (2)~~

AUTHORS: Ryabchikov, D. I., Vagina, N. S.

TITLE: Separation of the Bulk of Yttrium by Means of a Complex Formation

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol 5, Nr 1, pp 102 - 106 (USSR)

ABSTRACT: The chromatographic separation of the yttrium group elements is rendered more difficult by the fact that, as a rule, yttrium is present in a large excess (up to 90%). A prior separation of Y would greatly facilitate the separation of the other elements of this group. In reference 1, the authors had investigated the selective complex formation of this group. They now report on the separation of the Y-group in an yttrium- and a dysprosium concentrate by means of ethylene diamine tetraacetic acid (EDTA). Under investigation was a mixture with an 85% yttrium content and another with Y = 35%. The X-ray spectroscopic analysis made by N. V. Turanskaya on these mixtures is given in table 1. The precipitates and filtrates obtained after addition of different amounts of EDTA with different pH, were likewise investigated by X-ray spectroscopy (Tables 2-6), furthermore,

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Separation of the Bulk of Yttrium by Means of a Complex Formation

68113
SOV/78-5-1-18/45

the average atomic weight of the fractions was determined (Table 7). The distribution of the bulk of Y and Dy was controlled by additions of Y^{91} and Dy^{166} on the basis of β-radiation. The authors state that the different stability of the EDTA complexes at pH = 3 permits the separation of the Y bulk from the other rare earths of this group. The mixture is separable into three fractions within 10 hours, the first one containing elements Ho to Lu, the second containing Y, and the third the last five elements of this group. There are 7 tables and 2 Soviet references.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo Akademii nauk SSSR (Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy of the Academy of Sciences, USSR)

SUBMITTED: September 1, 1958

Card 2/2

S/078/60/005/02/018/045
B004/B016

5(2)
AUTHORS: Ryabchikov, D. I., Vagina, N. S.

TITLE: Comparative Evaluation of Various Complexing Agents With Respect to the Preparation of Enriched Concentrates of the Elements of the Yttrium Group

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol 5, Nr 2, pp 356-358 (USSR)

ABSTRACT: The latter author investigated the separation of the yttrium group by means of EDTA (Refs 1,2). It was the purpose of the present paper to replace the EDTA by other organic acids. The effect of the complexing agent was investigated on the basis of the separation of the Ho - Lu fraction. The effect of acetic acid, malonic acid, tartaric acid, lactic acid, citric acid, and nitrilo-triacetic acid was studied. The distribution of the rare earths among the individual fractions was determined by means of gravimetric analysis (Table 1), by Y^{91} and Tu^{170} (Table 2), and by X-ray spectrum analysis (Table 3). The authors found that lactic acid and citric acid were most effective. There are 3 tables and 2 Soviet references.

Card 1/2

Comparative Evaluation of Various Complexing Agents With Respect to the Preparation of Enriched Concentrates of the Elements of the Yttrium Group

S/078/60/005/02/018/045
B004/B016

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo Akademii nauk SSSR (Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy of the Academy of Sciences, USSR)

SUBMITTED: September 1, 1958

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~~69536~~ 69536

S/078/60/005/05/11/037
B004/B016

5.2200

AUTHORS: Ryabchikov, D. I., Yermakov, A. N., Belyayeva, V. K., Marov, I. N.

TITLE: Complex Formation of Zirconium and Hafnium With Some Hydroxy Acids

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 5, pp. 1051-1067

TEXT: The authors intended to investigate the stability of the complex compounds of Zr and Hf with various organic acids, and, in the case of differences in their stability, the development of a method of separating these two elements. G. A. Yevtikova took part in this investigation. The authors describe the reagents applied (tartaric acid, citric acid, malic acid, trihydroxy-glutaric acid, $HClO_4$, $ZrOCl_2 \cdot 8H_2O$, $HfOCl_2 \cdot 8H_2O$, cation exchangers of the KU-2 type, anion exchangers of the EDE-10p type). Zr^{95} and Hf^{181} were used as tracers. Preliminary experiments indicated that dicarboxylic acids (glutaric, glutamic, succinic, malonic, maleic, and fumaric acid) do not form complexes with Zr or Hf, whereas the afore-mentioned hydroxy acids (and the mesoxalic acid) change the distribution of Zr and Hf even in strongly acid media by the formation of stable complexes. Tables 1-5 give the experimental data for the five hydroxy acids in the presence of 0.125, 0.5, 1, and 2 M $HClO_4$, and the partition coefficients K_d as well as the separation factor $\alpha = K_{d_{Hf}} / K_{d_{Zr}}$.

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Complex Formation of Zirconium and Hafnium With Some Hydroxy Acids

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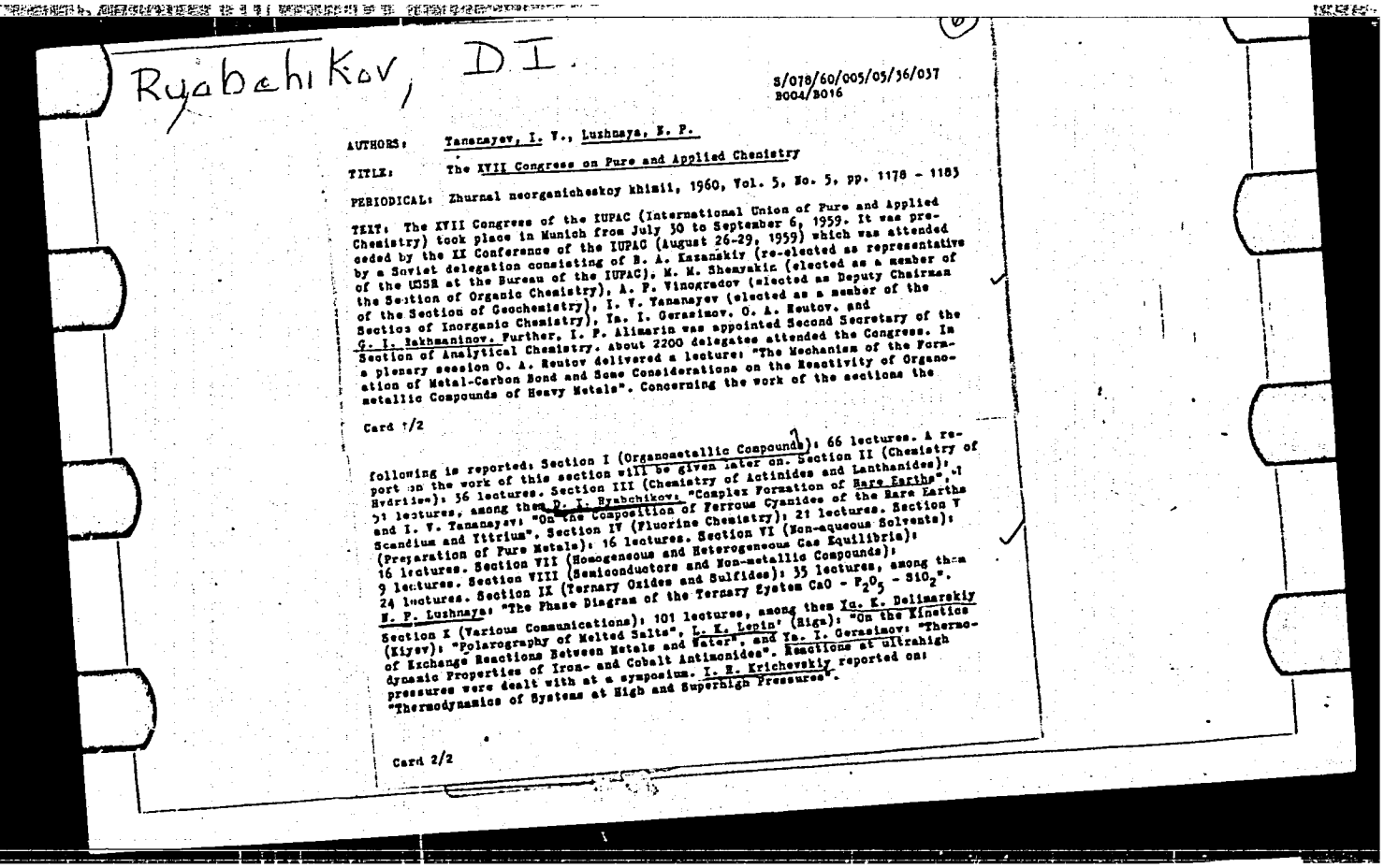
B004/B016

Figs.1-5 show the change of K_d in dependence on the concentration of the organic acid. $K_{d_{Zr}}$ is always smaller than $K_{d_{Hf}}$. For citric acid, $\alpha = 4$. The separation of Zr and Hf by means of KU-2 cation exchangers by elution with 1 M $HClO_4$ and 0.0256 M citric acid is based thereupon, as suggested and described by the authors. Fig. 6 shows the yield curves of the chromatographically separated complexes of Zr and Hf, which were identified by measuring their peaks by means of a γ-spectrometer (Fig. 7). This was carried out by G. A. Chernov. Figs. 8-11 show the dependence of $1/K_d$ on the concentration of the complexing substance. The authors determined the number of coordinate groups for the Zr and Hf complexes with the organic acids (Figs.12-15). Table 6 presents the data for the adsorption of Hf onto the EDE-10p anion exchanger. The formation coefficients of the complexes are given in Table 7. The authors discuss the structure of the complex compounds. As may be seen from Table 8, dicarboxylic acids (succinic acid) do not form complex compounds, hydroxy-dicarboxylic acids, however, do. This is indicative of the participation of both carboxyl and hydroxyl groups in the complex formation. The stability of the complex compounds of Zr and Hf decreases in the following order: Oxalic acid > mesoxalic acid ≫ trihydroxy-glutaric acid > citric acid > lactic acid > tartaric acid > malic acid. There are 15 figures, 8 tables, and 3 Soviet references.

SUBMITTED: July 30, 1959

Card 2/2



Ryabchikov, D.I.

S/078/60/005/05/36/037
B004/B016

AUTHORS: Tananayev, I. V., Lushnaya, E. P.

TITLE: The XVII Congress on Pure and Applied Chemistry

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 5, pp. 1178 - 1183

TEXT: The XVII Congress of the IUPAC (International Union of Pure and Applied Chemistry) took place in Munich from July 30 to September 6, 1959. It was preceded by the XI Conference of the IUPAC (August 26-29, 1959) which was attended by a Soviet delegation consisting of B. A. Kazanskiy (re-elected as representative of the USSR at the Bureau of the IUPAC), M. M. Shemyakin (elected as a member of the Section of Organic Chemistry), A. P. Vinogradov (elected as Deputy Chairman of the Section of Geochemistry), I. V. Tananayev (elected as a member of the Section of Inorganic Chemistry), Ya. I. Gerasimov, O. A. Reutov, and G. I. Bakhmanimov. Further, I. P. Alimarin was appointed Second Secretary of the Section of Analytical Chemistry. About 2200 delegates attended the Congress. In a plenary session O. A. Reutov delivered a lecture: "The Mechanism of the Formation of Metal-Carbon Bond and Some Considerations on the Reactivity of Organometallic Compounds of Heavy Metals". Concerning the work of the sections the

Card 1/2

following is reported: Section I (Organometallic Compounds): 66 lectures. A report on the work of this section will be given later on. Section II (Chemistry of Hydrides): 36 lectures. Section III (Chemistry of Actinides and Lanthanides): 21 lectures, among them D. I. Ryabchikov: "Complex Formation of Rare Earths", and I. V. Tananayev: "On the Composition of Ferrous Cyanides of the Rare Earths Scandium and Yttrium". Section IV (Fluorine Chemistry): 21 lectures. Section V (Preparation of Pure Metals): 16 lectures. Section VI (Non-aqueous Solvents): 16 lectures. Section VII (Homogeneous and Heterogeneous Gas Equilibria): 9 lectures. Section VIII (Semiconductors and Non-metallic Compounds): 24 lectures. Section IX (Ternary Oxides and Sulfides): 35 lectures, among them E. P. Lushnaya: "The Phase Diagram of the Ternary System $CaO - P_2O_5 - SiO_2$". Section X (Various Communications): 101 lectures, among them Yu. K. Delimarskiy (Kiyev): "Polarography of Melted Salts", L. K. Lepin' (Riga): "On the Kinetics of Exchange Reactions Between Metals and Water", and Ya. I. Gerasimov: "Thermodynamic Properties of Iron- and Cobalt Antimonides". Reactions at ultrahigh pressures were dealt with at a symposium. I. B. Krichevskiy reported on: "Thermodynamics of Systems at High and Superhigh Pressures".

Card 2/2

PRIVALOVA, M.M.; NYABCHIKOV, D.I.

Effect of hydrolysis on the extraction of antimony with diisoamyl ether and isoamyl alcohol. Zhur.neorg.khim. 5 no.7:1605-1611 Jl '60. (MIRA 13:7)

1. Institut geokhimii i analiticheskoy khimii im. V.I. Vernadskogo Akademii nauk SSSR.
(Antimony) (Extraction(Chemistry))

"

S/078/60/005/012/016/016
B017/B064

AUTHORS: Marov, I. N., Belyayeva, V. K., Yermakov, A. N., and Ryabchikov, D. I.

TITLE: Chromatographic Separation of Zirconium and Hafnium

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 12, pp. 2844-2847

TEXT: A new method of separating zirconium and hafnium by means of the KУ-2 (KU-2) cationite was developed. A solution of 0.025 mole citric acid and 1 mole perchloric acid, or 1 mole nitric acid, was used as desorbent. The rate of desorption is 0.5 - 0.6 ml/min·cm^2. Zirconium and hafnium were radiometrically analyzed in the extracts with the isotopes Zr^{95} and Hf^{181}. Fig. 1 shows the curves for the chromatographic distribution of Zr^{95} (+Nb^{95}) and Hf. It was found that with an increased loading of the cationite the value V_{max} rises, and the ratio $V_{max}Hf/V_{max}Zr$ decreases. This effect is explained by the formation of polynuclear zirconium complexes, and the effect of the large zirconium

Card 1/2

Chromatographic Separation of Zirconium and Hafnium

S/078/60/005/012/016/016
B017/B064

quantity upon the chemical behavior of hafnium. Fig. 2 shows the desorption curve of the chromatographic separation of Nb^{95} from zirconium and hafnium. The effect of mineral acids as desorbents upon the intensity of zirconium separation from hafnium was investigated, and it was found that when H_2SO_4 is used as desorbent separation is easier than when HNO_3 is used. The stability of zirconium and hafnium complexes with mineral acids decreases in the order: $H_2SO_4 \gg HCl > HNO_3$. G. A. Yevtikova assisted in the work. There are 2 figures and 3 references: 2 Soviet and 1 US.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo Akademii nauk SSSR (Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy of the Academy of Sciences USSR)

SUBMITTED: May 26, 1960

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AUTHORS: Rybchikov, D. I., Paley, P. N., Mikhaylova, Z. K.

TITLE: Separation of Uranium From Accompanying Metals by Ion Exchange Chromatography

PERIODICAL: Zhurnal analiticheskoy khimii, 1960, Vol 15, Nr 1, pp 88-95 (USSR)

ABSTRACT: Separation of uranium form V, Mo, Fe(III), Cu, and Pb by ion exchange chromatography was studied. The proposed separation is based on different abilities of the investigated elements to form complexes with complexon III. Sulfonic cationite (KU-2) and carboxyl cationite (IRC-50) were tested. Cationite KU-2 in hydrogen form and in sodium form were tested at different pH. Separation was conducted in a tube (25 cm high and 1 cm in diameter). Uranium was desorbed either with 10% HNO_3 and determined by the peroxide method or with 10% H_2SO_4 and determined by the vanadate

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method. The effect of pH on the sorbtion of the investigated cations is shown in Fig. 3 and 4.

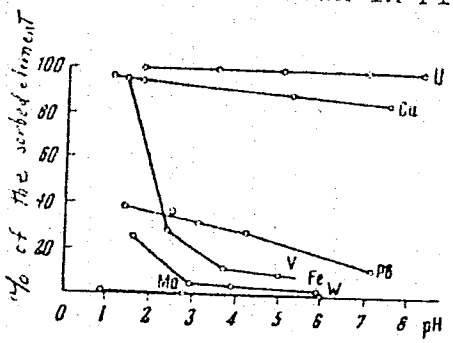

Fig. 3. Effect of pH on the sorbtion of U, Mo, V, W, Fe(III), Cu, and Pb in the presence of complexon III (cationite KU-2 in hydrogen form).

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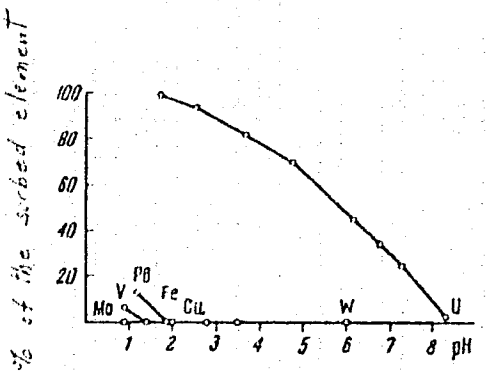

Fig. 4. Dependence of U, Mo, V, W, Fe(III), Cu, and Pb sorbtion in the presence of complexon III on pH (cationite KU-2 in sodium form).

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It is shown that uranium can be separated from the investigated elements in the presence of complexon III on the Ku-2 cationite in sodium form at pH

1.7-1.9. Results of the separation and determination of the investigated elements in some synthetic samples and in alloys are given in Tables 1, 2, and 3.

Table 1. (a) taken; (b) found; (c) error (%).

U, mg			Mo, mg			V, mg			W, mg		
(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
10,0	9,95	−0,5	10,0	10,0	0,0	—	—	—	—	—	—
12,40	12,43	+0,2	1,18	1,16	−1,6	—	—	—	—	—	—
12,40	12,45	+0,4	0,0987	0,099	+0,3	—	—	—	—	—	—
13,4	13,4	0,0	—	—	—	12,5	12,6	+0,8	—	—	—
13,4	13,5	+0,74	—	—	—	1,25	1,24	+0,8	—	—	—
13,4	13,5	+0,74	—	—	—	0,125	0,122	−2,4	—	—	—
15,4	15,25	−0,9	—	—	—	—	—	—	4,0	3,86	−3,5
12,56	12,56	+0	—	—	—	—	—	—	12,0	12,6	+5,0
40,0	39,8	−0,5	—	—	—	—	—	—	2,0	1,98	−1,0

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Table 2. (a) taken; (b) found; (c) error (%); (d) found in desorbed uranium solution.

U, mg			Fe, mg			Cu, mg		Pb, mg	
(a)	(b)	(c)	(a)	(b)	(c)	(a)	(d)	(a)	(d)
10,65	10,65	0,0	19,6	19,5	−0,5	—	—	—	—
22,05	22,0	−0,23	2,0	1,98	−1,0	—	—	—	—
1,0	0,985	−1,5	50,0	49,5	−1,0	—	—	—	—
10,05	10,0	−0,5	—	—	—	10,0	0,02	—	—
10,05	10,04	−0,1	—	—	—	0,2	0,0	—	—
10,05	10,25	+1,99	—	—	—	—	—	10,0	0,193
10,05	10,15	+0,9	—	—	—	—	—	4,0	0,046
10,05	10,09	−0,0	—	—	—	—	—	0,2	0,0

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Table 3. (a) sample; (b) uranium content (%); (c) chromatographic method; (d) hydrogen phosphate method; (e) specification data; (f) content of other element (%); (g) alloy U + Mo; (h) alloy U + W; (i) concentrate; (j) uraninite; (k) content.

(a)	(b) U, %			(f) %
	(c)	(d)	(e)	
(g) U + Mo	91,49	—	91,19	Mo 8,73
	91,24	—	—	—
	91,34	—	—	—
(h) U + W	96,103	—	—	—
	96,103	—	96,09	W 3,83
	96,24	—	—	—
	96,24	—	—	—
(i)	82,66	82,68	82,58	K
	82,66	—	±0,1%	Ca, Al, Mn
(j)	82,22	—	—	—
	82,04	82,48	—	—
	82,57	—	—	—

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Separation of Uranium From Accompanying Metals by Ion Exchange Chromatography

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It was found that uranium can be separated from the investigated elements in the presence of complexon III at pH 5.5-7.0 using the carboxylic cationite, amberlite IRC-50. Sorbtion of uranium is selective under the above conditions. V, Mo, W, and Fe(III) are not sorbed on the amberlite IRC-50 under the above conditions and Ni, Co, Zn, Al and other elements form (under the above conditions) anionic complexes which cannot be sorbed. A. V. Yamshchikov participated in the experimental work. There are 5 figures; 9 tables; and 17 references, 3 U.S., 2 German, 2 Swedish, 1 Czechoslovak, 9 Soviet. The U.S. references are: Kraus, K. A., Nelson, F., Moore, G., J. Am. Chem. Soc., 77, 3979 (1955); ibid. 78, 12, 2692 (1956); Blaedel, W., Knight, A., Analyt. Chem. 26, 743 (1954).

ASSOCIATION: V. I. Vernadskiy Institute of Geochemistry and Analytical Chemistry, Academy of Sciences USSR, Moscow

SUBMITTED: May 17, 1958

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77767
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AUTHOR: Ryabchikov, D. I.

TITLE: Current Events. Progress in Analytical Chemistry in China

PERIODICAL: Zhurnal analiticheskoy khimii, 1960, Vol 15, Nr 1, pp 127-128 (USSR)

ABSTRACT: This article covers the achievements in the field of analytical chemistry in the People's Republic of China. Through the expansion of educational facilities, cadres of new chemists are doing research at various institutes and laboratories (some of the latter, of mobile type). All educational and research facilities have up-to-date equipment and extensive libraries. At first, most of the equipment was imported from the USSR, German Democratic Republic, and Great Britain, but now much of it is of domestic manufacture. Soviet books are published in Chinese, and other foreign publications are photocopied and then distributed to many libraries

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Current Events. Progress in Analytical Chemistry in China

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Research in various fields of analytical chemistry is performed, among others, at the University of Peiping by Yehn-Jeng-ying and Kao-Hsiao-hsia, at the Institute of Applied Chemistry in Peiping by Liu-Ch'ên-i and Liu-Ta-kang, at the Chemical Institute of the Academy of Sciences by Liang-Shu-ch'uan, Chung-Yu-lan, at the Institute of Applied Chemistry of the Academy of Sciences by Yung-Shu-shang, at the Institute of Applied Chemistry of the Academy of Sciences in Ch'an-ch'un by Ts' on-Yun-hua and Wu-Hsüeh-chou, at the Institute of Applied Chemistry in Cheli by Tsung-Huang-pêng, at the Hsiang-Ming University by Lu-Tsung-lan and Huang-Yu-ying. There are well-equipped laboratories for spectral analysis at the academic institutious of Peiping, Shanghai, Ch'ang-sha, and others.

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RYABCHIKOV, D.I.

Rare earth elements, their properties, preparation, and uses. (MIRA 13:10)
Khim. v shkole 15 no.5:10-20 S-O '60.
(Rare earths)

RYABCHIKOV, D.I., doktor khim.nauk; KODYMSKIY, S.A., kand.khim.nauk; GUSARSKIY, V.V., inzh.

Use of anionites in the purification of vegetable oils. Masl.-zhir.prom. 26 no.4:33-35 Ap '60. (MIRA 13:6)

1. Moskovskiy pedagogicheskiy institut imeni N.K.Krupskoy. (Oils and fats) (Ion exchange)

S/074/60/029/010/004/004
B013/B075

AUTHORS: Ryabchikov, D. I. and Terent'yeva, Ye. A.

TITLE: News About Separation Methods of Rare-earth Elements

PERIODICAL: Uspekhi khimii, 1960, Vol. 29, No. 10, pp. 1285-1300

TEXT: The present article is a survey on separation methods of rare-earth elements. The aim of this paper is to make the reader acquainted with the progress achieved in the field referred to, both in the USSR and abroad. Beside the development of new but already approved methods of ion exchange, of extraction, and of electrochemistry, classical methods of fractional crystallization and precipitation are accomplished by introducing complex-forming agents (Ref. 4). Furthermore, completely new methods are suggested: the so-called "drying" method, the method basing on the very quick dehydration of chlorides, the oxysulfone method, and others. The following methods are particularly taken into consideration: Fractional crystallization and precipitation (Refs. 5-36); extraction by means of organic solvents (Refs. 37-66); ion exchange (Refs. 67-123); paper chromatography and electrochromatography (Refs. 124-132); method basing on the

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News About Separation Methods of Rare-earth Elements

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different mobility of ions (Ref. 133); methods basing on a change of the valence states of elements. Reduction (Refs. 134-140) and oxidation (Refs. 141-144) belong to these methods. Furthermore, the method depending on a different rate of dehydration of chlorides (Refs. 145, 146), as well as the magnetic method (Refs. 147-149) are briefly mentioned. A test of the separation methods described in publications, which was carried out under operating conditions, has shown that only few of them are noteworthy. It is apparently more rational to set up separation schemes composed of several methods. By this means all the advantages of these methods can be utilized as fully as possible. For the purpose of separating all pure elements from natural mixtures, D. I. Ryabchikov, M. M. Senyavin, and Yu. S. Sklyarenko (Refs.2 and 3) have developed a detailed scheme for the processing of rare earths. In this case a previous separation of the cerium subgroup from the yttrium subgroup is absolutely necessary. This is required also if the raw material employed consists of minerals of incomplete composition in which only one of the mentioned groups predominates. N. S. Vagina, G. Virts, N. N. Mironov, A. I. Odnosevtsev, R. V. Kotlyarev, G. P. Kozhemyako, V. M. Klinayev, V. V. Fomin, Z. F. Andreyeva, O. I. Rozhdestvenskaya, and A. K. Lavrukhina are mentioned. There are 149 references: 32 Soviet, 45 US, 8 British, 5 Chinese, 1 Hungarian, 2 Italian, 10 Japanese,

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PHASE I BOOK EXPLOITATION SOV/5777

Vinogradov, A. P., Academician, and D. I. Ryabchikov, Doctor of Chemical Sciences, Professor, Resp. Eds.

Metody opredeleniya i analiza redkikh elementov (Methods for the Detection and Analysis of Rare Elements) Moscow, Izd-vo AN SSSR, 1961. 667 p. Errata slip inserted. 6000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo.

Ed. of Publishing House: M. P. Volynets; Tech. Ed.: O. Gus'kova.

PURPOSE: This book is intended for analytical chemists and for students of analytical chemistry.

COVERAGE: The handbook was published in accordance with a decision of the Vsesoyuznoye soveshchaniye po analizu redkikh elementov (All-Union Conference on the Analysis of Rare Elements) called

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Methods for the Detection (Cont.)

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